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Factors in the Initial Interview Related to Counseling Continuation and Termination

Nineteen initial counseling interviews were investigated in an attempt to identify factors possibly related to counseling continuation or termination. Clients' concerns were identified prior to counseling and raters judged the extent to which these concerns were discussed in the initial interview. The raters also judged how well counselors developed client problems during the interview. Significant differences were observed between the expectations clients had prior to counseling and what actually occurred during the initial interview in four of the eight unsuccessful cases; in eight of the eleven successful counseling cases the expected content correlated highly with the actual content.

In the last decade tremendous efforts have been made to identify specific facilitative conditions in the counseling process that might be related to counseling effectiveness (Barrett-Lennard, 1962; Strupp *et al.*, 1964; Dickenson & Truax, 1966). However, there still seems to be a lack of follow-up research with clients who have progressed through a counseling experience. If the field of counseling is to be strengthened, the unsuccessful as well as the successful cases will have to be seriously investigated in hopes of identifying facilitating conditions related to client satisfaction.

The first phase of the present investigation (Altmann, 1967) dealt strictly with eight unsuccessful counseling cases. The findings revealed a significant difference in four of the cases between the expectations clients had prior to counseling and what actually took place in the initial interview.

Problem

In general, the purpose of this investigation was to study factors in the initial interview which might be related to apparent premature

termination or continuation of counseling. The present investigation extended the findings of the previous investigation by re-examining the same "unsuccessful" cases and then comparing them to 11 cases classified "successful" from the same sample.

More specific aims of the study were:

1. To determine if clients' expectations as indicated on the Warman Counseling Appropriateness Check-list (WAC, 1960) prior to counseling, were given adequate consideration by counselors during the initial interview; and if so, was this in some way related to counseling continuation.

2. To determine whether the problem, once identified in the initial interview, proceeded through the four stages of Topic Development (Allen, 1946); and whether the degree of development could be related to termination or continuation of counseling. Within an interview Allen found topic development to proceed through the following stages: (a) statement of the problem, (b) development of the problem, (c) summarization, and (d) making plans.

3. To determine whether four new raters[1] could rate the same eight interviews with as high agreement as the first group of raters in classifying client responses of the initial interview and rating four stages of Topic Development. The new raters were also assigned the task of rating 11 additional interviews that were classified "successful."

Methods and Procedures

Typescripts of 19 initial interviews used in this study were obtained from seven counselors and 19 clients at the University of Wyoming. The clients were volunteers from five Personnel and Guidance Study Skills classes. In completing a pre-counseling data sheet, clients in this study indicated a desire to meet with a counselor regularly on a weekly basis for 10 counseling sessions or longer. Counseling which terminated after one session was classified as unsuccessful.

One week prior to counseling all prospective clients rseponded to the WAC. This instrument was used to collect data about what concerns the client wished to discuss with a counselor and whether these problems gained consideration in the initial interview. The WAC, which contains 66 items, categorizes problems into the three areas of College Routine, Vocational Choice, and Adjustment to Self and Others.

Each initial interview was recorded and then transcribed into typescript form. Upon completion of the interview, follow-up discussions were held with the clients, counselors, and practicum supervisors concerning their reaction to the interview. Later, each client's response was numbered on the typescript; and four raters, working independ-

[1] The first group of raters had completed the advanced counseling practicum requirement at the doctorate level at the University of Wyoming. The second group of raters had completed a master's practicum course at the University of Calgary.

ently, classified each response according to the three areas on the WAC.

The raters then focused on the main topic of discusson in the interview and rated the adequacy of its development. These items were rated on the degree to which they were satisfactory according to Allen's four point theory of Topic Development.

Of the 26 clients who started counseling, 8 clients terminated after the initial interview and were classified as unsuccessful. Eleven clients continued counseling for 10 sessions or more and were classified as successful counseling cases. Seven cases were eliminated from the study due to technical difficulties.

The expansion of the binomial was used to evaluate the degree of agreement among the raters on the WAC and stages of Topic Development. Agreement beyond chance at the .05 level occurred on each occasion where at least three of the four raters assigned the client's statement to the same category.[2] A comparison of the "expected" (WAC) content with that of the "observed" (typescripts) content of the initial interview was made through an adaptation of chi-square analysis (Garrett, 1958).

Results and Conclusions

The statistical findings revealed a significant difference between the expectations clients had prior to counseling and what actually occurred during the inital interview in four of the eight "unsuccessful" cases (Table value $= 5.991$, $df = 2$, $p < .05$). (Note: Altmann's 1967 findings yielded approximately the same results.)

When rating the 19 interviews according to the four stages of Topic Development the raters were found to be in agreement on 66 per cent of their classifications. (Note: Altmann's 1967 findings of rater agreement was 75 per cent.)

The 19 interviews contained well over 2,000 client statements. When classifying these statements according to the areas of the WAC the raters were found to be in agreement 88 per cent of the time. (Note: Altmann's 1967 findings of rater agreement was 91 per cent.)

Discussion

Several factors seemed to contribute to the findings in comparing the "expected" and "observed" content of the initial interview. Four of the clients classified as unsuccessful were provided little opportunity to explore the desired areas as indicated on the WAC. Responses by these clients to the WAC indicated their desired interests for discussion with a counselor to be either College Routine or Vocational

2 Rating classifications were: 1 (excellent), 2 (appropriate), 3 (poor or inadequate), 4 (not considered).

Choice. Regarding these four clients, three of the initial interviews indicated that approximately 75 per cent of the clients' statements actually pertained to the area of Adjustment of Self or Others.

Follow-up interviews with unsuccessful clients revealed dissatisfaction with the counselor's inactivity in not giving the client some type of direction after the problem had been realized. Several clients gained the impression that the counselor did not seem to treat the stated problem with importance and several times delayed the discussion. Two clients felt that lack of insight by the counselor in failing to recognize the problem was disturbing and related to termination. This dissatisfaction was verified by typescripts.

The investigation indicated that most counselors touched upon the clients' problems early in the interview; however, this did not necessarily result in a thorough exploration of the problem. In the eight unsuccessful cases the raters felt "the problem" (Stage 1), was clearly identified; however, the subsequent three stages were classified by the raters as "poor or inadequate" or just "not considered."

Findings indicated that in 8 of the 11 successful counseling cases the expected content (WAC) correlated highly with the observed content. Topic Development in these cases revealed that the first three stages received "excellent" or "appropriate" ratings in seven cases. The successful counselor seemed to pursue and clarify the problem once it had been identified, often making plans for dealing with the problem in following interviews.

The findings indicate that raters can show very high agreement in classifying client statements, and rating stages of Topic Development. A significant aspect of this research was that four new raters classified the content of the eight unsuccessful interviews essentially the same and with very high agreement.

The research implies that counselors should be sensitive to the immediate concerns of the client even though it may not be the main reason for seeking assistance. Lack of concern by the counselor with certain client problems (i.e., study skills) which involved "poor or inadequate" pursuit of problem development had an adverse effect on several clients. Successful counseling seems to be related to more of a sincere interest and exploration of the presented problem by the counselor.

One cannot validly assume there should necessarily be high agreement between client concerns on the WAC and what is discussed in the initial interview. However, when the content of the WAC and the interview are in high agreement, and the counselor is instrumental in side-tracking the discussion, then early termination or unsuccessful counseling can only be a product of the counselor.

References

Allen, K. P. An analysis of the development within a topical unit in the counseling interview. Unpublished master's dissertation, Ohio State University, 1946.

Altmann, H. A. An investigation of initial interviews and early termination of counseling within a practicum setting. *The Journal of the Canadian Association of University Student Personnel Services,* 1967, *2* (1), 3-11.

Barrett-Lennard, G. T. Dimensions of therapist response as casual factors in therapeutic change. *Psychological Monographs,* 1962, *76,* (43, Whole No. 562).

Dickenson, W. A., and Truax, C. B. Group counseling with college under-achievers. *The Personnel and Guidance Journal,* 1966, *45* (3), 243-247.

Garrett, H. E. *Statistics in psychology and education.* New York: Longmans, Green and Co., 1958.

Strupp, H. H., Wallach, M. S., and Wogan, M. Psychotherapy experience in retrospect: Questionnaire survey of former patients and their therapists. *Psychological Monographs,* 1964, *78* (11, Whole No. 588).

Warman, R. E. Differential perceptions of counseling role. *The Journal of Consulting Psychology,* 1960, *7,* 269-274.

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Financing Post-Secondary Education in Alberta

The basis of financing Junior Colleges in Alberta is a per-student grant. The problem of whether or not this type of grant, which provides a measure of fiscal equity, would provide the necessary flexibility for developing institutions constituted the subject of the research reported in this paper. A program cost analysis was conducted for junior colleges in Alberta. The resulting cost data showed wide difference in the cost per student for similar programs in each college. The reasons for the differences were analyzed and discussed and a type of financing system based on program budgeting and budget approval was recommended.

Early in 1969 the Provincial Board of Post-Secondary Education for the Province of Alberta commissioned research into the operation of the present system of financing Junior Colleges in the Province, with a view to providing some alternative plans prior to the development of the Junior College system in the province.[1]

This paper provides a summary of some of the major findings of this research report together with a report of the recommendations made at the conclusion of the study. The study should be of interest not only to those concerned with the administration of Junior College Systems but also to those responsible for designing school and university support systems, since many such systems use the per-student grant as a basis for distributing aid.

Problems in the Use of Per-Student Grants

Junior Colleges presently are financed on the basis of a weighted per-student grant which, until this year, provided only part of the operating revenue of Junior Colleges. The balance of revenue was provided by fees and by the proceeds from the yield of a local property tax. In 1969 the local property tax support was abolished with the intention of

1 Atherton, Peter J. *Financing Post-Secondary Education in Alberta.* Edmonton Post-Secondary Education Commission, 1970.

providing the greater part of college revenue from Provincial Funds, leaving fees as the only source of local revenue. The major question to be answered therefore, was, does a system which provides a fair measure of fiscal equity also provide a sufficient measure of educational flexibility?

There were *a priori* reasons for considering that such a system would not provide such flexibility.

Of necessity the per-student grant, whether weighted for program differences or not is a reflection of average expenditure data gathered at some time in the past. Because the grant is based on average practice, the grant will cover a variable percentage of the cost of providing different programs, since it costs differing amounts to provide different programs at the same institutions as well as among institutions. The assumption is made, however, that the grant will "work out" inasmuch as the subsidy effect generated by low cost programs will offset the cost of the more expensive programs. This assumption is tenable only where the mix of programs among institutions is very similar. In other words, where the range of programs is markedly different from the range of programs which reflect the provincial average there is likely to be a wide variation in the proportion of total operating costs covered by the per-student grant.

To some extent this variation may be reduced by weighting different programs in accordance with program cost data, but nevertheless there still exist differences in the costs of offering similar programs in different institutions.

Such problems are not always obvious in college systems which have changed from a form of local cost-sharing to a centralized system since grants were originally introduced as a form of stimulation aid in order to encourage local authorities to improve their educational offering. With such systems of aid, deficiencies in the per-student grant are to be expected, and would be made up by local revenues. In a system of provincially financed Junior Colleges, the only alternative source of revenue is fee revenue. It is highly likely, therefore, that a per-student grant based on average practice, which might be inadequate for smaller colleges would place the burden of financing additional services upon the student body, the very people whom the colleges wish to attract.

One alternative is to rearrange college programs in such a way that the per-student grant together with the fee revenue, provides the subsidy effect necessary to offset the costs of more expensive programs. This alternative may not have altogether desirable consequences. The effect may be to influence unduly the direction of program development in any individual community college and it is not certain that the role of a support program should be to direct or influence programs.

To examine these problems it was necessary to undertake an anlysis of the cost per student of providing each of the varied programs offered by the five institutions which comprise the system. One college was unable to provide the required data and so the study was restricted to four of the colleges in the province.

Unit-Cost Analysis Techniques

Such analyses are normally termed unit-cost analyses and although prevalent in the business world, are relatively new in education. The introduction of newer budgeting techniques and systems analysis procedures to educational organizations has created a growing interest in unit-cost analyses.

The technique usually employed in unit-cost studies involves the gathering of three sets of data: (a) direct expenditures, (b) implementary expenditures, and (c) auxiliary statistics such as the number of pupils enrolled in courses. The expenditure data from (a) and (b) provide the dividend, and the data from (c) the divisor, for the computations of unit-costs.

The overall structure for the treatment of the three sets of data referred to above is typically as follows: all expenditures for an institution are collected, and determined to be direct or implementary in nature; these expenditures, through direct assignment or proportionate allocation, are attributed to instructional units such as programs and courses. Unit-costs may then be derived at the pupil, course, or program level.

The analysis of direct expenditures is the most straightforward aspect of educational cost analysis and consists of the allocation of course expenditures. Instructional salaries, instructional supplies, laboratory equipment and clerical and instructors' salaries account for the major part of such expenditures. However, there are two possible methods of computing instructional salary cost per student in junior college programs. The first method is based on a straight per-student basis resulting in proportionate sharing of instructional expenditure by all programs. The second method is based on the assumption that there are courses basic to any given program and that the cost of providing such courses would be charged to that program but that these same courses may enrol students from other programs without increasing the cost of providing such courses. If, however, enrolment in the courses from students in other programs increases to the point where it is necessary to provide additional sections, then the cost of the extra sections should be charged to the other programs.

The first method was selected as being more appropriate for this study since the intention was to provide an estimate of cost per-student year rather than per program. It may also be noted that the first

method permits the isolation of high cost low enrolment courses, the identification of which may be overlooked when using the grosser measure.

Since the usual goal of a cost analysis is the conversion of the sum of all institutional expenditures (capital, operational, or both) to some measure of "product cost," the expenditures associated with activities supportive to instruction, or implementary expenditures, must be allocated to instructional programs and/or courses.

Basically, it is the method by which implementary expenditures are allocated which differentiates one cost analysis design from another. These differences in design result from the selection, for each analysis of a justifiable method of allocating the costs of general administration, student services, staff welfare and services, public service and information, general institutional expense, library expense, and physical plant expense to instructional programs without incurring burdensome analytical procedures and expense.

Although there are a number of specific allocation methods in use, the method known as the straight-line method was selected as being appropriate for this study.

The straight-line method assumes a linear relationship between (1) quantities of implementary services consumed by each program, and (2) the amount of implementary expense to be allocated to each program. This method entails the use of only one base in allocation; in other words, implementary expenditures are allocated soley on, say, a "per pupil," a "per square foot of instructional area," or "per faculty member" basis.

The relative simplicity of this method, however, may lead to loss of accuracy and detail. For example, if a "per pupil" base were employed in the allocation of all implementary departments, large irregularities in class sizes could lead to a distorted distribution of physical plant expenses.

The straight-line base for implementary expenditures was used in this study for a number of reasons. First, there was no evidence to show that gross irregularities existed among pupil-instructor ratios for programs, and a measure of pupil enrolment therefore reflected a measure of use of supportive departments. Second, the implementary departments of the participating colleges were few in number, all their activities virtually focussed on the task of instruction; any required compensation for interdepartmental allocation would thus be minimal. Third, since the outputs for the colleges were to be compared, a common basis of allocation was desirable. Since the setting of each college differed from that of the other two colleges, the only common base feasible was a "per pupil" base.

There were two well-defined steps in the estimation of the unit-cost per pupil in each of the institutions studied:

1. Estimation of Course Costs
2. Estimates of Program Costs

Estimation of Course Costs

The per-student cost of offering each course was compiled from two sets of cost data:

(a) Direct costs of instruction

(b) Indirect costs of instruction

The direct costs of instruction for each course were derived from a Faculty Workload analysis. Faculty members were asked to estimate the proportion of their time taken up instructing in course. This proportion was applied to the total of salary and fringe benefits per staff member to provide the total cost of instruction per course. The cost per student was obtained by dividing the total direct cost per course by the enrolment. The indirect costs were compiled from the ledger accounts of the Colleges.

Estimation of Program Costs

The per-student cost for each program was compiled by taking the per-student cost of each course, prescribed by the College calendar as being requisite for a particular program, and summing them. To this figure was added the per-student implementary expenditures.

The Findings

Course Costs

In general it was found that two variables, salary of the instructor and enrolment in the course were the two most important determinants of course costs. One unanticipated finding was that Laboratory Courses,[2] in spite of the extra time normally devoted to instruction, were not *per se* more costly than other courses. In the four colleges analysed the most costly courses were: a secretarial science course; a French course, a German course and an Automotives course.

Whilst laboratory courses were not always the most costly, each of the four low cost courses were offered in either sociology or psychology.

Tables 1 and 2 provide a breakdown of course enrolments and costs.

a. *Enrolment distribution.* Table 1 shows the total number of full year courses offered at each college, together with the distribution by numbers and percentages of enrolments.

As may be expected, the largest college had the highest percentage of courses with an enrolment of 30 and above. At the same time, this college also had the highest percentage of courses enrolling fewer than nine students.

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2 The term Laboratory Course is here extended to include technical courses with workshop requirements.

The difference in distribution between College A and College B is also worth noting, although both colleges had similar programs and enrolments. In College A some 66 per cent of the courses offered enroll fewer than 30 students, and 50 per cent enroll fewer than 20 students. In College B, just over half the courses had fewer than 30 students. In College C, 60 per cent of the courses had fewer than 30 students, with 45 per cent of the courses enrolling fewer than 20 students. It is also clear that, with the exception of College D, all the colleges conducted the bulk of their courses with enrolments of between ten and thirty.

Perhaps one of the more significant aspects of this table is the lack of any well-defined pattern. One cannot say that the distribution of enrolments was influenced strongly by the size of the college. The distribution for College A is bimodal, whereas the College B distribution shows a definite trend to an increasing percentage of courses with higher enrolments. In both colleges, enrolments are similar. Again, College D shows a bimodal distribution although total enrolment was almost four times that of College B or A.

TABLE 1

BREAKDOWN OF FULL YEAR COURSES BY ENROLMENTS

College	Total Enrolment	Total number of courses	Enrolments 1-9		10-19		20-29		30	
			N	Percent	N	Percent	N	Percent	N	Percent
A	309	47	8	17	18	38	5	11	16	34
B	373	33	0	0	6	18	10	30	17	51
C	580	53	11	19	12	26	13	24	17	31
D	1,331	18	4	22	2	11	1	6	11	61

TABLE 2

BREAKDOWN OF FULL YEAR COURSES BY PER STUDENT COST

College	Total Enrolment	Total Number of Courses	Course Costs Per Student: $50 or less		$51-99		$100-199		$200-499		$500	
			N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
A	309	47	0	0	15	32	19	40	11	23	2	4
B	373	33	1	3	4	12	19	58	9	27	0	0
C	580	53	1	2	7	13	25	47	18	34	2	4
D	1,331	18	2	11	6	33	4	22	4	22	2	11

b. *Cost distribution.* Table 2 provides details of the distribution of instructional costs per course.

Again, as was to be expected, the largest college showed the highest percentage of low cost courses and, as was noted with the enrolment distribution, the highest percentage of high cost courses. It may be reasoned that factors which accounted for enrolment distributions helped to account for the cost distribution.

This table shows that the distribution of course costs for College A and College B were more similar than the enrolment distributions. In both colleges some 70 per cent of courses cost between $51 and $199 with the bulk of these falling in the range between $100 and $199. In the case of College C, the emphasis is on the higher range with 81 per cent of courses costing between $100 and $499, with 34 per cent of the courses costing more than $200. In this College a substantial proportion of courses costing more than $200 per student were to be found in the School of Technology where student contact hours are heavy and course enrolments lower. At College D, only 55 per cent of the courses were in the range of $51 to $199, but the effect on total cost is lessened by the relatively high proportion of courses costing $50 or less.

Implementary Expenditures

Monies spent for auxiliary services, including counselling, library and health services, were included with administrative costs for the purposes of the study. The costs associated with the release time for administrative purposes were also included as being applicable to general administration.

The scope of this paper precludes the possibility of providing a complete analysis of implementary expenditures but details of the per-student costs of implementary expenditure, are provided below in Table 3.

TABLE 3

DETAILS OF PER PUPIL IMPLEMENTARY EXPENDITURES

College	Enrolment	Counselling	Library	Health	General Admin.	Total
A	309	$18	$43		248	309
B	373	$35	$ 1		495	531
C	580	$45	$90		469	604
D	1130	$38	$55	8	281	382

1. *Counselling.* In counselling there appears to be a close similarity between the per-student expenditures among the different institutions.

The similarity reflects that the costs of counselling service tend to be directly associated with enrolment. However, the wide difference between College A and College B, with similar enrolments, should not be overlooked. This difference may be accounted for by the fact that in College A counselling was the part-time assignment of one faculty member, whereas in College B counselling was a full-time assignment.

2. *Library.* A much greater range of costs may be seen in library expenditures. This was expected, however, since there is a degree of "lumpiness" involved in the provision of library services. That is to say, there will be a minimum expenditure on library services, perhaps the salary of one full-time librarian, regardless how small the institution. Such minimum expenditure may be adequate to provide service over a range of enrolments. When enrolments or program offerings increase beyond a certain point, the services of two full-time librarians may be required. The total expenditures will increase sharply, as will the per-student costs. Thus, there need be no direct linear relationship between enrolment and cost over the short term. It is also interesting that the provision of health services does not add appreciably to total cost in College D where enrolment is large. The provision of Health Services is, of course, subject to the same "lumpiness' of inputs as Library services.

3. *General Administration.* Some difficulties were experienced in attempting to compare expenditures on General Administration. The data for College B, for instance, included the sum of $76,186 in respect of debt retirement and interest. Since this item was not a regular payment, it might be considered that normal operating implementary expenditures could be reduced by that much. Such a reduction would reduce the cost to $327 per student and make it comparable. Similarly, there is an item for debt repayment of $52,200 at College C which would reduce per-student administrative cost in that institution by some $90. The administrative overhead in the case of D is increased by the presence of a net deficit on the operation of college enterprises, including snack bar, dining room, bookstore, and residence. In this college, although residence is subsidized by the other operations, the deficit still amounts to some $19 per student. On the other hand, since College A operates in rented accommodation, the total bill for plant operations and maintenance is somewhat lower than it would be if the College had its own premises. With these factors in mind, it would appear that the costs per student of administration bear a strong similarity to each other.

The literature suggests that we might expect to find certain economies of scale in regard to administrative services. There is no clear evidence to support this case in the light of present analysis, however.

It is possible that dramatic economies of scale should not be expected below a level of enrolment higher than that of colleges in the present system. In the very small college it is likely that no high degree of administrative departmentalization will exist. As a college increases in size, specialization of administrative function is likely to lead to the creation of new administrative departments and a problem of co-ordination arises. Furthermore, as a college increases the scope of its activities, both in terms of regular progam offering and variety of offerings, so the burden on administration increases. This argument would tend to be supported by the present analysis since both College D and C show per-student costs higher than the smaller institutions of B and A.

It is difficult to make generalizations because of the small number of institutions included in the study, but it would appear that the smaller colleges expended some 30 per cent of their budget for administration (bearing in mind the heavy debt repayment for College B) and that the largest college expends some 25 per cent (if the net deficit on residences is ignored).

Program Costs

Efforts were made to present estimates for programs which were common in two or more colleges.

The total per student cost per program is the sum total of prorated implementary expenditures, indirect expenditures and the instructional cost of each course comprising the program. Because the majority of programs provide for options, a maximum and minimum cost per program has been provided. The maximum cost is that program cost which would result if students chose the most expensive options and the minimum cost is that which would result if students chose the least expensive options.

It is interesting to note that of all the many and varied programs which are offered by all the institutions, the programs selected for inclusion in Table 4 almost exhaust the possibility of comparison. This is seen of considerable importance, since any grant structure based on the cost of operating programs would need to be structured in very general terms unless it were decided to provide some basic programs at each institution.

Before commenting on Table 4, it would be appropriate to point out that because of the large debt repayment in the implementary expenditures, all program costs at College B are overestimated by almost $100 per pupil. Similarly, program costs in College C are influenced by the high per-student cost of implementary expenditures. College B costs are also inflated by the higher per-student costs of providing supporting services.

TABLE 4

RANGE OF PROGRAM COSTS IN JUNIOR COLLEGES

Program	College A Minimum	College A Maximum	College B Minimum	College B Maximum	College C Minimum	College C Maximum	College D Minimum	College D Maximum	
Agriculture	798	1,178	1,465	1,823			1,113		University Transfer Alberta
Home Economics	896	1,429	1,379	2,040			1,985		University Transfer Alberta
Denistry, Premed	950	1,480	1,387	2,158			1,296		University Transfer Alberta
Business	714	1,176	1,328	1,680					University Transfer Alberta
Physical Education	902	1,504	1,340	1,952			2,120		University Transfer Alberta
B. A. General	714	1,176	1,249	2,258			1,509	1,631	University Transfer Alberta
Education	656	1,258	1,388	1,890			1,189	1,281	
Journalism (Year 1)					1,491			1,187	2 year terminal
Journalism (Year 2)					1,449			1,826	
Recreation			1,235	1,818	1,197			1,348	1 year College D
Recreation					1,275	1,460			2 years College C
Business Administration			1,462		1,138		1,480		Year 1, 2 year program
Automotives					2,332				
Electronics					1,983				

These factors, however, arise out of specific institutional environmental factors and do not detract from the fact that there is a wide variation in per student costs both within and among institutions.

Within institutions the range of per-student cost for university transfer is close to 30 per cent in College A, at the minimum level, and almost 100 per cent in College D. The range in maximums and the minimum in College B were less than 10 per cent.

Among institutions there was also a wide range of cost for comparable programs.

The range in minimum cost University Transfer programs was from $656 per student year in education to $2,120 per student in the B.A. General. In terminal programs, the minimum range is from $1,138 in Business Administration to $2,332 in Automotives. Both of these programs are offered at the same college. The maximum range is from $1,176 in the B.A. General to $2,258 also for the B.A. General taken at a different college.

It is clear that programs in Technology offered at College C were considerably more expensive to offer than most transfer programs. One reason for the high cost of these programs is that course requirements are so restrictive that students do not appear to be able to take advantage of low cost options. Such low cost options appear to be available for programs of a more general nature, as is evidenced by the wide difference between maximum and minimum costs in other programs. It is worth noting that in programs at College C where students may utilize options (Recreation), or where courses are common to more than one program (Business Administration) the program costs are reduced.

It is possible that the apparent lack of economics of scale is due to the existence,throughout the whole college system, of a standard faculty student ratio. If the faculty-student ratio is fixed at, say 1:15, it seems clear that no matter how large the student population grows, the per-student cost, or that proportion of cost accounted for by instruction, is not likely to decline significantly.

Conclusions and Recommendations

The findings of this study substantiated many of the *a priori* objections to the per student grant.

For example in College C[3] where the mix of programs was different to that of the provincial average, some measure of fiscal hardship resulted. In College D, although the College administration desired to move out of University Transfer programs, the cost analysis demonstrated that unless there were changes in the form of financing, it would be necessary to retain these programs in order to provide a subsidy for the newer and more expensive programs. In this case the

[3] This College had incurred substantial deficits in the annual operating budget.

form of financing dictated to an extent, the choice of program offering. Variations in the amount of fixed cost among the institutions reduced the proportion of the per student grant available for program development and instruction. Thus the findings of the study suggested that the per-student grant, particularly when it was not supplemented by a source of local revenue did reduce the degree of flexibility and adaptation desirable.

To increase the degree of flexibility for colleges the report recommended that a system of Budget approval be instituted. It was recommended that colleges be required to prepare budgets using a program format rather than the functional-objective format in present use.

It was considered that one of the major advantages of shifting to this type of format would be to encourage local administration to perform analyses of their current operations and to provide a basis for discussion between colleges and the central financing agency as to the setting of priorities, both local and provincial.

Also proposed were a series of constraints which would act to control the level of cost but not act to inhibit local decision making. One constraint proposed was a variable limit to Faculty Student ratio which would provide for percentage reduction in the allowable faculty as the total size of the student body increased. Another proposal provided for a limit to the percentage of total expenditure which might be allocated to administration and general overheads, not including supporting services such as library and counselling.

The system of financing post-secondary education proposed in this report is at present being considered by the Post-Secondary Education Commission for Alberta and there are indications that a modified system of Budget Approval may be introduced.

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A Comparative Study of Different Modes of Presentation on Efficiency of Learning and Retention

This study was concerned with the problem of learning and retention with special consideration given to single channel presentation modes. One hundred twenty grade eight students were exposed to one of three learning tasks (paired associates) and were post-tested for retention on a strict schedule. The learning tasks were presented with a constant printed word stimulus. The responses were printed words, pictures, and spoken words depending on the experimental treatment group. Students in the picture response group made correct associations with fewer errors and retained information over the seven day period significantly better than did the other two experimental groups.

Background to the Study

Research in audio-visual education is often concerned with the effectiveness of differing modes of instruction. Usually, the teacher as one of the mediating devices, is compared with another mediating device. A measuring instrument is administered to evaluate the amount of learning that has occurred and statistical tests of the differences are computed. However, none of the audio visual studies documented in the third edition of the *Encyclopedia of Educational Research* (C. W. Harris 1960, pp. 115-137) compares the effectiveness of single channels of communication.

Some studies have been concerned with the basic problem of the comparative effectiveness of the audio or visual modes of teaching. Hartman (1961, p. 237) states that of fourteen studies comparing the effectiveness of the print and audio channels using nonsense syllables and digits, eight studies reported print as the more effective mode, five favoured the audio and one reported no significant difference be-

tween the two. Since the results favouring audio were achieved with young children and those favouring print were achieved with older children or adults, he concluded that the results are not strictly comparable. Of fifteen studies comparing audio and print using meaningful words, eight found print more effective, three favoured audio and four found no significant differences. In commenting on these studies, Hartman states that "the print channel becomes more effective relative to the audio as the difficulty of the material for the subjects increases, provided a fair degree of literacy is present", (Hartman 1961, p. 237).

Using another fourteen studies comparing the pictorial mode with print and audio, five were reported by Hartman as having found the picture better than print, six found the picture better than audio, and three found no consistent differences. He suggests that some caution is necessary in interpreting the above results. The reasons for his lack of confidence in the findings are:

1. there are few studies
2. the older studies are defective in experimental design
3. testing always involved verbal items
4. the relative difficulty of the pictorial and verbal information was neither known or controlled. (Hartman 1961, p. 239)

The problems probably arose from "lack of randomization, improper control of conditions, insufficient number of repetitions, invalid or reliable tests, and a lack of probability statements" (p. 239). None of the studies reported compared all three modes of presentation.

Lumsdaine (1963, pp. 636-637) worked with paired—associate learning tasks comparing the "functioning of pictures and printed words as associative cues and as reponse prompts". His results showed that the use of pictures as the stimulus component of the pair was better than a verbal presentation, and that a verbal presentation was superior to a pictorial presentation in the response position. Wimer and Lambert (1959, pp. 31-36) found that it required fewer trials to pair nonsense syllables to objects than to words. There is some indication that the response half of the pair deserves more attention. Underwood and Schultz (1960, p. 37) state that it is the meaningfulness of the response that is most critical. With this background information to consider, this study was undertaken to explore the area of single channel communication attempting to take into consideration the weakness of the past studies. Three modes of presentation were used in this study, a factor not incorporated into the earlier studies reported.

Procedure and Materials

The subjects for the study were 120 grade eight boys and girls from the Edmonton Public School System. The Junior High Schools were ranked by mean SCAT scores and five were chosen by stratified

sampling. Students were randomly selected from the grade eight classrooms in the chosen schools.

Forty students were placed in each of the three treatment groups and ten students from each treatment group were placed in one of the four post-test groups (Immediate, 30 minutes, 48 hours, and 7 days).

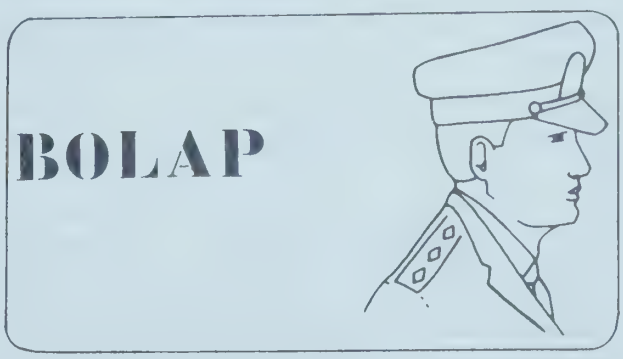
The learning tasks consisted of ten paired associates taken from Nobel's list of di-syllables (Underwood and Schultz 1960, p. 331). The words were arranged with a low meaningfulness stimulus and a high meaningfulness response. The stimulus items were selected on the basis of pronouncability and the response items on the basis of easily illustrated and readily identifiable features.

Learning tasks used were as follows:

Zumap—Quarter; Bolap—Captain; Goken—Insect; Rennet—Wagon; Bodkin—Mallet; Sagrole—Money; Meardon—Zebra; Volvap—Jelly; Tarop—Keeper; Attar—Jewel.

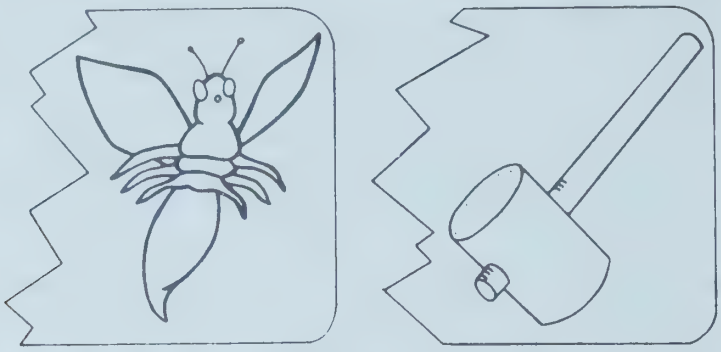
In the learning situation the students in treatment group one saw *each* of the above learning tasks presented in the following manner:

In treatment group two they saw:



And in treatment group three they saw:

and heard the word Captain. Other examples of the visuals used by treatment group two are:



Black and white slides were made of the above words and their appropriate figures. One set of learning task slides for each treatment, one set of testing slides (only responses—printed words and pictures) and two sets of response items were produced. A tape with audio-verbal response items was produced for testing treatment group 3.

The learning tasks were presented using a stacking slide projector, the testing response slides were presented using a Carousel projector. The Carousel was modified in such a way that when a student depressed the button to signify a choice of slides, the remote advance mechanism would no longer advance the slide tray. Students in treatment group 3, wore head sets attached to a tape recorder so that they could hear the correct response word and make a selection from the taped response words during the testing phase. All test response items were arranged in the same order and the testing stimulus items were randomized between showings.

Each student was taken, individually, to a testing room in his school. Upon entering the room the student was seated facing a projection surface at a distance of about five feet. Directly behind the subject was a table on which rested all projection and sound equipment. Each student was given a set of written directions and then asked to watch the projection surface.

The students in *Treatment Group I* saw each of ten learning task slides with a visual-verbal stimulus and response printed word one at a time for five seconds. There was a short pause and then the stimulus half of the pairs appeared in the same place on the screen and each of the response words was flashed, one at a time, at one second intervals immediately to the right of the stimulus word. The subject responded by pressing a button when he saw a word he thought matched the stimulus word. Once the subject had made a response, or had seen all the possible response slides, the next stimulus word appeared and again a randomized set of response slides was shown. The subject's responses were recorded. The learning task slides were again shown and again the subject was tested and his responses recorded. The tasks were

defined as having been learned when two successive correct responses had been made to any one learning task. When any learning task was learned to this criterion level, it was removed from the learning and testing situation. Only the ten-item multiple choice response slides stayed unaltered by the learning of items.

Once all ten items had been learned to the criterion level, the subject was dismissed until recalled for his testing as per the post test group to which he had been assigned.

The subjects in *Treatment Group 2* went through exactly the same procedure except that their response mode was in the form of a picture of the word used in Treatment I.

The subjects in *Treatment Group 3* went through the same procedure as Treatment Groups 1 and 2 except that the response was spoken to them each time they saw the stimulus in the learning situation, and a tape recorded list of ten response words was played back in the testing situation. In all cases the student *spoke* the response word after he heard it on the tape.

Statistical Design:

A three way analysis of variance was chosen to test the hypotheses that:

I. There is no significant difference in the number of errors made in reaching learning criterion:
   A. Between means
   B. When the tasks are presented in print, pictorially or auditorially.
   C. In the delayed post-test groups.

II. There is no significant difference in the score or the delayed post-test.
   A. Between means
   B. As a result of presentation mode.
   C. In the delayed post-test groups.

Results:

Hypothesis I

Initial testing of the data indicated that the assumption of homogeneity could not be met. The data were transformed using logarithm of X (Lindquist, p. 88), and a one way Analysis of Variance performed on it. The results showed that a highly significant F ratio existed in the variable Mode or B. *T* tests were employed to locate the exact areas of significance as there were three different modes to compare. The t tests indicated that subjects in *Treatment Group 2* (picture response) made significantly fewer errors in learning the tasks than did subjects in the other two treatments (printed and spoken words), and that scores

made by subjects in Treatment Groups 1 and 3 (printed and spoken words) did not differ significantly.

Hypothesis II

A three way analysis of co-variance was used to analyze the data for Hypothesis II. The resulting information showed that only factor C (post-test group) had a significant F ratio. The Newman-Keuls test on all post test mean scores produced no significant difference between any treatment mean scores after immediate post-test, 30 minutes or 48 hours. Retention after seven days, however, was significantly better in the picture treatment group than either of the other groups. Retention scores in the printed and spoken word (Treatments 1 and 3) groups fell significantly during the seven day delay post-test period. In the picture treatment (group 2) scores did not differ significantly during the entire post-test delay period. The following graph illustrates the mean scores on delay post-testing.

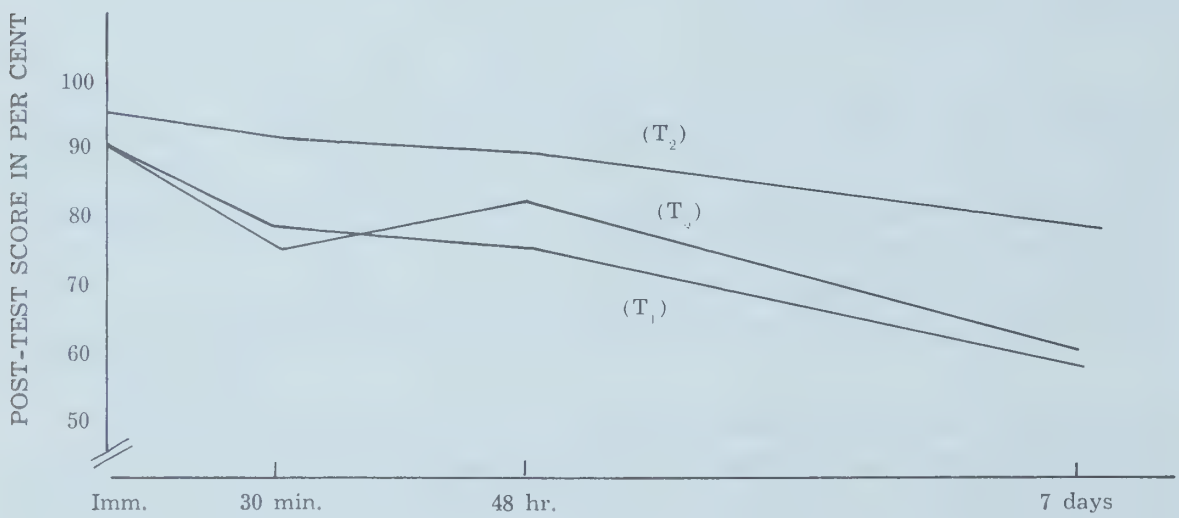


FIGURE I
GRAPH OF WITH-IN CELL MEAN SCORES USING
DELAY TEST RESULTS

Conclusions

Students who were required to associate a low-meaningfulness English word with a picture (T_2) were able to make the necessary associations with significantly fewer errors to the learning criterion than were students who were required to match the same low-meaningfulness word with either the printed word (T_1) or the spoken word (T_3).

Students who learned to associate words with pictures (T_2) scored significantly higher than students who learned to associate the same words with printed words (T_1) or spoken words (T_3) after a delay period of seven days.

Scores in groups using printed and spoken words (1 and 3) fell significantly after seven days while scores in Treatment Group 2 (pictures) did not differ from each other significantly at any of the four post-test times.

Discussion

Hypothesis I

Since there was a highly significant difference between Treatment Group 2 (picture response) and the other two treatment groups, and since the printed and spoken word response groups did not differ significantly, a look at their characteristics in each case is necessary. It should be recalled that a printed word was used as a stimulus item in each treatment group. In group one and three the response was verbal, though visual and auditory respectively. Despite the fact that one was visual and the other auditory, there was no significant difference in the number of errors each group made in reaching the learning criterion. It would seem that *visual* as opposed to auditory is not a factor operating here.

In Treatment Group 2 (picture response) the scores were significantly different from the other two groups. In this case both treatment one and two were visual, yet the scores were significantly different. This would tend to substantiate the suspicion that the differences are not a function of *visualness,* but are a function of verbal as opposed to non-verbal, or abstract versus concrete. Wimer and Lambert (1959, p. 35) suggest that a difficulty in this kind of learning arises from generalizations among stimuli and responses where there are verbal items. They further suggest (1959, p. 35) that the physical similarity of objects appears to be much less than among object names.

Hypothesis II

That there was no significant difference in post-test scores immediately after the test item was learned to criterion, no matter what method was used for teaching, implies that the materials were initially learned to the same extent. It is therefore signficant that over a period of seven days the relative permanency of the learning accomplished using the pictures as response items should be displayed. The students in this treatment group, on the average, did not score differently at the end of any of the four post-test periods. Students in both verbal oriented groups scored significantly lower after seven days than at any of the other three post-test times. Their learning was relatively short lived.

When compared across treatment groups, the results indicate that only after seven days does any significance of difference show up. Again the picture response group was superior and there was no

significant difference between the two "word" groups. This result tends to substantiate the media field's contention that more concrete learning is more permanent.

While further research is needed, the results of this study do suggest a more efficient method of forming associations in learning discrete forms of information and of retaining the information learned.

References

Harris, C. W. (Ed.), *Encyclopedia of Educational Research* (3rd. ed.) New York: Macmillan Company, 1960.

Hartman, F. R. Single and multiple channel communication: A review of research and a proposed model. *Audio Visual Communication Review,* 1961, *9* (6), 235-262.

Lindquist, E. F. *Design and Analysis of Experiments in Psychology and Education.* Boston: Houghton Miflin, 1953.

Lumsdaine, A. A. Instruments and Media of Instruction. In N. L. Gage (Ed.), *Handbook of Research on Teaching.* Chicago: Rand McNally, 1963.

Underwood, B. J. and Schultz, R. W. *Meaningfulness and Verbal Learning.* Philadelphia: Lippincott, 1960.

Wimer, C. C. and Lambert, W. C. Differential effects of word and object stimuli on the learning of paired associates, *Journal of Experimental Psychology,* 1959, *57* (1), 31-36.

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Acquisition of Experimental Attitude by Young Children

The purpose of this inquiry was to determine whether or not a group of youngsters who were taught by teachers high *in experimental attitude would be more experimental in attitude than a group of youngsters who were taught by teachers* low *in experimental attitude after one academic year. Differences between the groups were not statistically significant. Related findings of the study were: (1) Teachers* high *in experimental attitude, as determined by a self-report instrument, were perceived by pupils to be significantly higher in this than were teachers who described themselves as* low *in experimental attitude; (2) Youngsters who were taught by teachers* low *in experimental attitude were significantly more discrepant or dissatisfied than youngsters who were taught by teachers* high *in experimental attitude; (3) According to pupils' self-perception and their perception of teachers, the pupils were significantly higher in experimental attitude than were the teachers.*

A prodigious amount of effort in the fields of education and psychology has recently been invested in studying children in early childhood. This investment is illustrated in the type of work undertaken by Montessori (8) and Piaget (6). Montessori centred on intellectual development from a psychological approach which hinges somewhat upon the affective dimension. Piaget focussed on concept formation relative to the cognitive realm. Other illustrations are found in the work of Peck (9) and his associates who approached the affective domain essentially from a general, theoretical vantage point and with socio-psychological orientation; Bloom's (1) primary concern was to investigate the extent to which some human characteristics, basically of cognitive domain, could be improved from pre-school period to adolescence if an optimal environment were provided.

This study which is different from inquiries into the cognitive realm of human development and from investigations into the affective

domain with socio-psychological orientation, was designed to investigate the acquisition by young children of an experimental attitude in terms of John Dewey's philosophy of experimentalism. Therefore, what was investigated in this study was carried out with specific reference to this philosophic school of thought.

This investigation stemmed essentially from an earlier study (4), in which the Pupil Situational Inventory (PSI), an instrument to measure 4th-6th graders' experimental attitude, was developed in accord with a theoretical framework for Dewey's philosophy (2). It was decided to extend the inquiry to the third grade level by slightly simplifying the language of the PSI without altering the theoretical positions in terms of Dewey's experimentalism. Obviously related to this extension was the hypothesis that the younger the child is, the more susceptible is its affective development to the inculcation of values, beliefs, and attitudes. Hence, the main hypothesis of this study was:

Children who are taught by teachers *high* in experimental attitude are more experimental in attitude than children who are taught by teachers *low* in experimental attitude after one academic year.

Related to this main hypothesis were four sub-hypotheses:

1. There is a difference between the *high* (children taught by teachers high in experimental attitude) and the *low* (children taught by teachers low in experimental attitude) groups in their perception of what their respective teachers are like.

2. There is a difference between the high and the low groups in their teacher discrepancy scores (which are the *absolute* differences between the kinds of teachers that children indicated they would like to have and the kinds of teachers that they thought their teachers were).

3. There is a difference between pupils' experimental attitude scores and their teacher perception scores (which are scores derived from responses by children to the question: "Is your teacher like this?" in the instrument) for the *high* group.

4. There is a difference between pupils' experimental attitude scores and their teacher perception scores for the *low* group.

Method

As mentioned earlier, the instrument used in this study was one slightly simplified in language from that for 4th-6th grade pupils. Even though validity and reliability were established for the original instrument (5), the *E* decided that it was essential to obtain two additional items of information before the study was undertaken. One was to find out whether or not the third graders could comprehend the meaning of the items; the other was to determine its test-retest reliability.

As far as the comprehension of the PSI (3rd-4th grade) was con-

cerned, it was administered to one 3rd grade and one 4th grade (N=57) in Nova Scotia by the *E*. It was discovered that no item in the instrument was not understood by these *S*s. Sample items from the instrument, which consists of 47 items, are presented below:

1. Do you like a teacher who often lets you make guesses about something?	Yes	I am not sure	No
+Ve[1]			
Is your teacher like this?	Yes	I am not sure	No
2. Do you like a teacher who would let you try things out?	Yes	I am not sure	No
+Ve			
Is your teacher like this?	Yes	I am not sure	No
3. Do you like a teacher who wants you to follow exactly her way of doing things?	Yes	I am not sure	No
—Ve			
Is your teacher like this?	Yes	I am not sure	No
4. Do you like a teacher who is interested in telling you lots of things, but not how to do things?	Yes	I am not sure	No
—Ve			
Is your teacher like this?	Yes	I am not sure	No
5. Do you like a teacher who does not let you ask a question about what she thinks is right or wrong?	Yes	I am not sure	No
—Ve			
Is your teacher like this?	Yes	I am not sure	No

Shortly after the pilot test was completed, the instrument was given to another group of 3rd-4th graders in Nova Scotia (N=78) for establishing a test-retest reliability coefficient; this was found to be .75.

The main study was undertaken after the tasks described above had been completed. The research plan was a two-group pre- and post-test design, in which neither randomization nor matching of *S*s was required. However, inherent in this design was the pre-requisite that the instrument intended for teachers and that for their pupils must be

[1] The positive item indicates what Dewey's philosophy is in favor of, and the scoring is 3, 2, 1. The negative item indicates what his philosophy is opposed to; the scoring is 1, 2, 3.

developed from the same theoretical framework and logically must measure the same trait. As alluded to earlier, the Experimentalism (X) Scale (1), in this case for teachers, and PSI for pupils were developed from the same theoretical framework for Dewey's philosophy and were constructed to measure experimental attitude in terms of his philosophy.

During the orientation day for teachers for the 1968-69 academic year, the X Scale was administered to all twenty-five 3rd-4th grade teachers in School District No. 14, New Brunswick. It appeared to be cooperative; the time that they took to complete this self-report device was about 20 minutes on average.

After teachers' scores on the X scale had been obtained, the top two and the bottom two scores were chosen in accord with the design of this study. Pupils taught by the top two teachers constituted the high group, and pupils taught by the bottom two teachers became the low group. The scores of the top two teachers were significantly different statistically from those of the bottom two teachers. It was also established that none of these four teachers taught any of the youngsters in the 1967-68 academic year. Hence, it was reasonable to say that there was no contamination on the treatment before the experimentation.

During the first week of the 1968-69 school year, the E administered the PSI to these four classes as the pre-test in which the question "Is your teacher like this" was not included because children hardly knew their teachers. After the teachers had left their rooms, the E motivated the Ss with these statements: "This is NOT a test, because it has no right and wrong answer. What you have to do is to tell me the kinds of teachers that you like and the kinds of teachers that you do not like." Ss were instructed to put a mark to indicate their choice on any of these three points of a continuum. Yes, I am not sure, No. The E read each question slowly and waited for several seconds. No questions were asked during the testing.

After the item order had been randomized, the E post-tested the Ss in mid-May of 1969. In the post-test, the question "Is your teacher like this" was included. Therefore, the E had to assure the Ss that their teachers would never see what they put down with a view to providing an environment conducive to free expression.

Results and Interpretations

Prior to the presentation of results, it seems appropriate to clarify and to re-reiterate a few points. First, the pre- and post-test measures were solely designed for the main hypothesis of the study, that is, children who are taught by teachers high in experimental attitude are more experimental in attitude than children who are taught by teachers low in experimental attitude after one academic year. Second, the question "Is your teacher like this" was asked only in the post-test.

Therefore, all sub-hypotheses of the study were confined to post-test results, namely, teacher discrepancy scores and teacher perception scores. Third, for sub-hypotheses 1 and 2, the analysis was performed to test the difference *between* the high and the low groups, but for sub-hypotheses 3 and 4, the analysis was carried out *within* the high and the low groups respectively, as so dictated by the sub-hypotheses.

A *t* test for uncorrelated groups with unequal Ns was used (7) for the main hypothesis and sub-hypotheses 1 and 2. For sub-hypotheses 3 and 4, a *t* test for correlated groups, or the same group with two sets of scores, was applied. Means, standard deviations, and the size of samples are presented in Table 1.

TABLE 1

CHARACTERISTICS OF THE SAMPLES

Hypothesis	Group	N	Mean	SD
Main Hypothesis	High	43	8.41*	9.89*
	Low	34	7.97*	11.39*
Sub-Hypothesis # 1	High	43	104.48	10.40
	Low	34	92.38	11.41
Sub-Hypothesis # 2	High	43	25.32	12.43
	Low	34	37.23	14.98
Sub-Hypothesis # 3	High	43	110.27	12.06
	High	43	104.48	10.40
Sub-Hypothesis # 4	Low	34	107.14	11.55
	Low	34	92.38	11.41

*gain scores

For the main hypothesis, the gain scores, which were obtained by subtracting the pre-test scores from the post-test scores, were used for analysis. A *t* value of 0.18 was found statistically not significant. The hypothesis was therefore rejected.

For the first sub-hypothesis, namely, "There is a difference between the high and the low groups in their perception of what their teachers are like," the scores were obtained from the question: "Is your teacher like this?" in the post-test. A *t* value of 4.80 was found significant at .01 level. This finding indicated that the youngsters in the high group perceived

their teachers as being significantly more experimental in attitude than did the youngsters in the low group.

For the second sub-hypothesis, namely, "There is a difference between the high and the low groups in their teacher discrepancy scores," discrepancy scores were used for analyses, which were obtained by summing the absolute differences between the kinds of teachers that these youngsters would like to have and the kinds of teachers that they thought their teachers were. Explicitly, the teacher discrepancy scores were obtained from the absolute discrepancies between "Would you like a teacher who . . .?" and "Is your teacher like this?" A t value of 3.73 was obtained which is significant at .01 level. One way to interpret this finding is that the low group youngsters were significantly more discrepant or dissatisfied than were the high group youngsters in terms of the kinds of teachers that they would like to have and the kinds of teachers that they thought they had.

For the third sub-hypothesis, namely, "There is a difference between pupils' experimental attitude scores and their teacher perception scores for the high group," a t value of 4.27 was found significant at .01 level. This finding tended to show that the high group youngsters were significantly more experimental in attitude than their teachers, according to pupils' perception of themselves and of their teachers.

For the fourth sub-hypothesis, namely, "There is a difference between pupils' experimental attitude scores and their teacher perception scores for the *low* group", a t value of 5.16 was significant at .01 level. Like the high group, one indication that this finding could give was that according to these pupils' self-perception and their perception of teachers, the low group youngsters were significantly more experimental in attitude than were their teachers.

Implications

At least three implications could be drawn from the findings of this study:

First, teachers high in experimental attitude, as measured by the X Scale, were perceived by their pupils as being significantly more experimental in attitude on the basis of the PSI than teachers low in experimental attitude were perceived by their students. This finding tends to provide further evidence for the validity of the X Scale and the PSI (3-4 grade).

Second, youngsters in both the *high* and the *low* groups perceived that they were more experimental in attitude than were their teachers. On the basis of this finding, the following questions might be raised. What is the relation between the possession of the degree of experimental attitude and the length of time that one has spent in schools? Are teachers less experimental in attitude than the general public?

If so, what are some of the factors correlated with this phenomenon? How inhibiting are the school curricula in terms of undermining experimental attitude? How do we propose to set up different kinds of school environments in order to identify the facilitating as well as the impeding factors for an experimental attitude?

Third, youngsters when taught by teachers *low* in experimental attitude had significantly greater discrepancy scores than youngsters when taught by teachers *high* in experimental attitude. How is this teacher discrepancy related to their attitude towards school, emotional development, drop-out problem, juvenile delinquency, and eventually perhaps to happiness or the lack of it in life? These questions and those mentioned above might be investigated in future research projects.

References

Bloom, B. S. *Stability and Change in Human Characteristics.* New York: John Wiley, 1964.

Brown, B. B. The Relationship of Experimentalism to Classroom Practice. Unpublished doctoral dissertation, University of Wisconsin, 1962.

Brown, B. B. *The Experimental Mind in Education.* New York: Harper & Row, 1968.

Cheong, G. S. C. "Relations Among Experimental Attitude, Creativity, School Attitude, Sociometric Status of 4th-6th Grade Pupils". *Journal of Teacher Education,* 1967, *18,* 186-191.

Cheong, G. S. C. "Pupil Situational Inventory: A Measure of Experimental Attitude". *Journal of Experimental Education,* 1969, *38,* 24-30.

Flavell, J. H. *The Development of Psychology of Jean Piaget.* Princeton, New Jersey: Van Norstrand, 1963.

Guilford, J. P. *Fundamental Statistics in Psychology and Education,* New York: McGraw-Hill, 1965.

Montessori, M. *The Montessori Method.* New York: Schocken Books, 1964.

Peck, R. F. et al. *Psychology of Character Development.* New York: John Wiley, 1960.

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Effect of Socio-Economic Status and Auditory Discrimination Training on First-Grade Reading Achievement and Auditory Discrimination[1]

This article reports the relationship found in two studies between auditory discrimination and reading achievement of first grade pupils. Auditory discrimination was measured with an instrument constructed by the researchers. The Fast study found a significant relationship between auditory discrimination and both reading achievement and socio-economic status. The pattern of discrimination errors was the same for all children in the sample but the other than low socio-economic group achieved consistently higher scores than the low socio-economic group. The Cosens study revealed that taped training in auditory discrimination resulted in improved scores on total auditory discrimination and several sound types, but not on oral or silent reading. Some types of sounds were significantly more difficult to discriminate than other types.

One of the first to suggest that reading disability may be caused by an inability to discriminate the speech sounds of words was Monroe (1932). Today most educators agree that the ability to discriminate among speech sounds is a basic factor that affects reading readiness and achievement. They tend to emphasize the importance of auditory discrimination in word perception contending that the development of auditory discrimination is necessary for the formation of phoneme-grapheme associations (Wepman, 1961; Harris, 1962).

Auditory discrimination affects reading indirectly through its relationship to language development. C. P. Deutsch (1964, p. 278) con-

1 This article is a summary of two graduate investigations conducted under the direction of Dr. Jean E. Robertson at the University of Alberta.

tends that "it is only through experience which involves consistent exposure to particular auditory stimuli that a child comes to discriminate sounds and to recognize words." Olmstead (1966) hypothesized that learning the phonology of a language is a function of the ease of perception of sounds. He predicted that more discriminable sounds are learned earlier than less discriminable ones. It is probable that auditory discrimination both affects and is affected by language development.

The ability to discriminate speech sounds has been found to vary according to individual differences among students, one such difference being the socio-economic status of the individual. M. Deutsch (1963) contends that lower class children tend to live in noisy environments with little directed speech stimulation. These children probably become inattentive to auditory stimuli and hence have difficulty making auditory discriminations. Research studies tend to support the hypothesis of a relationship between auditory discrimination and socio-economic status (Mortenson, 1967; Clark and Richards, 1966).

Other reader characteristics which have been found to be variables in the development of auditory discrimination are: auditory acuity (Monroe, 1932; Robinson, 1946); sex with auditory development somewhat slower in boys (Wepman, 1961; Dykstra, 1966); intelligence and mental age (Wheeler and Wheeler, 1954; Thompson, 1961); and chronological age (Wepman, 1960; Dykstra, 1966).

Research Instrument

One of the reasons why results of studies concerning the relationship between auditory discrimination and reading achievement in the primary grades are inconclusive is that a variety of instruments measuring several different facets of auditory discrimination have been employed. These studies were considered carefully to determine which type of measuring device yielded results consistently related to reading achievement in the primary grades.

Several studies attempted to determine the relationship between ability to discriminate rhyming elements in words and reading achievement. Results of these have been either not significant (Gates and Bond, 1936), or have yielded low correlations (Gates, 1940; Dykstra, 1966).

The relationship between auditory fusion and reading achievement was first considered by Monroe in 1932. She and several researchers since have found significant relationships between auditory fusion and reading achievement (Chall, 1963; Dykstra, 1966). Correlations have, however, generally been low.

Bond (1935) and Gates (1947) found that reading achievement was significantly related to ability to give words beginning and ending

with particular sounds. Reid (1962) also found significant but low correlations between reading and ability to recognize similarities in consonants and rhymes. Dykstra (1966), however, gave two different measures of this ability and found one highly related to reading achievement while the other yielded a low correlation. A further difficulty with tests which measure the ability to recognize or produce words with similar sounds is that they depend to some degree on the pupil's ability to recognize pictures or the number of words he has for recall.

Two researchers (Harrington and Durrel, 1955; Thompson, 1961), used a battery of auditory discrimination tests and found significant relationships between reading achievement and auditory discrimination. Dykstra (1966) found in his study that there was little justification for giving more than one or two auditory discrimination measures. He stated that "very little improvement in the accuracy of prediction can be expected as a result of giving an entire battery of auditory discrimination tests . . ." (p. 32)

Several studies have used a word pairs test to measure auditory discrimination. Many researchers (Monroe, 1932; Robinson, 1946; Gates, 1947; Steinbach, 1953) have found the results of this type of test significantly related to reading achievement. All investigations using the *Wepman Auditory Discrimination Test* found significantly positive correlations (Christine and Christine, 1964; Wepman, 1960; Reid, 1962). Hence, the Wepman test appeared to be a useful instrument for identifying pupils whose inadequate auditory discrimination was interfering with their reading achievement. The relatively low correlations found by some investigators, however, may indicate that Wepman's test does not clearly discriminate between subjects with good and poor auditory discrimination. It was on this supposition that a revised word pairs test was devised.

Data presented by Miller and Nicely (1966) in a study of discrimination errors provided a basic guideline for choosing items directed towards probable trouble spots in auditory discrimination. They indicated that voicing and nasality were the most discriminable features of speech sounds and that friction, duration, and place of articulation were much less discriminable. Therefore, the research instrument did not include items which required discriminations between voiced and voiceless sounds, or between nasal and non-nasal sounds. Items were chosen which required discriminations involving friction, duration, and place of articulation.

Items on the *Fast-Cosens Auditory Discrimination Test* were also based on an analysis of articulatory defects since auditory discrimination and articulation are closely related (Bruns, 1957; Christine and Christine, 1964). The principal reference for determining specific articulatory defects was Templin's *Certain Language Skills in Children*

(1957). Consideration was given in the construction of the research instrument to all sounds in any word position which 5 per cent of the children in Templin's sample could not articulate correctly at age six.

Another criterion for selecting items on the test instrument was information concering the frequency of phonemes in the English language as reported by Miller (1951). Consonants which are rarely used were included in only a few comparisons, whereas those used frequently were given priority on the test instrument.

Using the above three criteria, the following items were included in the *Fast-Cosens Auditory Discrimination Test*:

1. Comparisons of the velar nasal / ŋ / with other nasals in the medial and final position;
2. Every possible comparison among voiced fricatives except those with / ž /;
3. Every possible comparison among voiceless fricatives except those with / h /;
4. Some comparisons of fricatives with non-fricatives in similar places of articulation;
5. Comparisons of affricates with fricatives in similar places of articulation;
6. Comparisons between the glides / r,w / and the lateral / I /;
7. Comparisons among voiceless stops in the medial and final positions, and among voiced stops in the final position.

During actual construction of word pairs containing the above contrasts, the work of Liberman (1966) and others was kept in mind. It has been found that sounds are affected by the articulatory movement that is made when going from the consonant to the vowel. Words containing a variety of vowel sounds following the consonant to be discriminated were chosen.

To minimize the influence of chance, three unlike and three like pairs were included wherever possible for each phoneme contrast.

Two word controls were exercised in the construction of the test. The Gage *Dictionary of Canadian English, The Beginning Dictionary* (1962) was used as the authority for sound control on pronunciation to determine whether contrasts were minimal pairs. Frequency control was exercised by selecting words as close in frequency of use as possible from the *Lorge-Thorndike Teacher's Word Book of 30,000 Words* (1944).

A pilot project was conducted in March, 1968 in Edmonton to determine which items clearly discriminated between subjects with good auditory discrimination and those with poor auditory discrimination. An item analysis was carried out after test results were recorded from the pilot study. A KR-20 reliability index of .95 was obtained from the item analysis. Each item was evaluated using the

difficulty index, the biserial correlation, and the reliability index. Difficulty indices were corrected for chance according to Guilford (1954) and items with corrected difficulty indices between .25 and .75 were retained wherever possible.

The test was administered by having subjects listen to a tape recording of word pairs and indicate whether the word pairs were the same or different. The items were presented on a tape recorder to ensure that each word pair was heard with the same quality, pitch, stress, and time interval by all students as well as to prevent the possibility of providing visual clues. There was a four second interval between each word pair to give children sufficient time to make the desired response.

The Fast Study

In order to assess the effect of socio-economic status on the development of auditory discrimination as it relates to reading achievement, this study compared the auditory discrimination of selected speech sounds of first-grade students in low socio-economic areas with that of students from other socio-economic areas. The auditory discrimination test used for assessing students was the *Fast-Cosens Auditory Discrimination Test* constructed by the investigators. This study attempted to identify specific auditory discrimination difficulties in selected speech sounds. One and two way analyses of variance, correlations, and step-wise linear regression analysis were employed to determine the extent and significance of the obtained relationships. In addition, a test item analysis was conducted on the *Fast-Cosens Auditory Discrimination Test* to determine the difficulty of specific items.

The test sample of 120 students selected for this study was obtained from eight of the forty public schools in Saskatoon, Saskatchewan. Four of these schools were designated by school officials as being in a low socio-economic area, and four were designated as in areas other than low socio-economic. Sixty students from each of the two socio-economic areas were selected for the test sample using a table of random numbers. The *Blishen Occupational Class Scale* (1961) was used to verify the socio-economic status of each child. A socio-economic score for each student was determined by averaging the scores of his parents. Students in the low socio-economic group in this study were those receiving scores of class six and seven on the Blishen scale, while students from the other socio-economic areas represented classes one to five inclusive.

The *Monroe New Basic Reading Test,* Pre-primer and Primer levels, in conjunction with teacher observations served as a basis for designating students to a low reading achievement group, and to a group other than low reading achievement. The *Metropolitan Reading Achieve-*

ment Test, Primary 1, Form B, was then administered in May by the experimenter to verify the reading achievement level of each child.

An auditory acuity screening test using the Maico Audiometer was given to each child to assure that poor auditory discrimination was not due to deficient auditory acuity.

The sample was subsequently divided into the following four groups: low socio-economic status — low reading achievement (LSES-L. Rdg. Ach.); low socio-economic status—other than low reading achievement (LSES-OTL. Rdg. Ach.); other than low socio-economic status—low reading achievement (OSES-L. Rdg. Ach.); and other than low socio-economic status—other than low reading achievement (OSES-OTL. Rdg. Ach.). Each of the four groups consisted of 30 students.

The total number of boys in the test sample was 59, with 34 of these in the low reading achievement group. There were 26 girls in the low reading achievement group. The average age of the students was 6 years 10 months. Intelligence quotients were obtained from the *Lorge-Thorndike Intelligence Test,* Level 1, Form A. The mean intelligence score for the total test sample was 107.

Analysis of the Fast-Cosens Auditory Discrimination Test

The general performance of student groups revealed that the OSES group performed consistently higher than the LSES group. Only in five isolated instances did the LSES group exceed the OSES group. In these cases the items were difficult for all students. Out of a possible total of 266, the mean score for the OSES group was 226, while the mean score for the LSES group was 206. The LSES-L. Rdg. Ach. group received the lowest mean score, 199, while the OSES-OTL. Rdg. Ach. group received the highest mean score, 237. These results suggest that LSES children have not developed their auditory discrimination abilities to the same extent as OSES children.

The type of contrasts most easily discriminated by students in both socio-economic groups were the glide-lateral comparisons. These items were answered correctly by 86 per cent of the students in the OSES group and 73 per cent of the LSES group. Glide-lateral comparisons were not included in the final position of words. Since the final position tends to cause difficulty for children, this may partly account for the relative ease of discriminating these items.

The most difficult contrasts were between nasals which 75 per cent of the OSES group and 58 per cent of the LSES group could discriminate correctly. On every type of sound comparison, the performance of the OSES group was superior to that of the LSES group, with the differences ranging from 10 to 17 per cent. These findings suggest that both the quality and quantity of speech may be lacking in homes of lower class students.

A consideration of voicing indicated that voiceless fricatives were

the least difficult items for both socio-economic groups, with 82 per cent of the OSES group and 73 per cent of the LSES group responding correctly. This finding does not agree with most research which suggests that sounds at high frequency levels are difficult for students to distinguish.

Voiced fricatives were the most difficult items in the consideration of voicing. In these comparisons 74 per cent of the OSES group and 57 per cent of LSES group answered items correctly. Performance was well below the overall test norms of 86 per cent and 78 per cent respectively. The most difficult single comparison was /v/-/ð/ in the final position. This comparison may be more difficult than others because both sounds are articulated near the front of the mouth at a similar frequency level. The OSES group performed considerably better on all contrasts involving voicing than did the LSES group. The percentage of difference ranged from 9 to 18 per cent.

Each of the six different types of sound comparisons on the test were included in the initial, medial, and final word positions wherever possible. The OSES group found stops in the final position, fricatives in the initial position, and affricate-fricative comparisons in the initial position the most difficult items to discriminate when position alone was considered. The LSES group also found that stops in the final position, affricate-fricative comparisons in the initial position, and nasals in the final position were difficult items.

A further analysis of position of sounds in combination with voicing indicated that the easiest sounds to discriminate were voiceless fricatives in the medial position. Voiced fricatives in the final position were the most difficult items for all students. Voiced and voiceless stops in the final position were also difficult items to distinguish, particularly for the LSES group. Seven of the nine voiced final stops were within the most difficult range of difficulty. All nine voiceless stops in the final position fell into the most difficult range.

The above results indicate that not only does a particular type of contrast or position of sound cause difficulty for students, but that particular combinations of contrasts, position, and voicing contribute to the difficulty of discriminating speech sounds.

Considering position of sounds on the overall test, the final position was the most difficult in which to discriminate sounds while the medial position was the easiest. If initial stops and nasals had been included in the comparisons of test items, the overall initial position may have been easier than the overall medial position.

Correlations and Analyses of Variance

When correlating auditory discrimination with each of the predictor variables, it was found that sex and auditory discrimination were not

significantly related. The girls did achieve slightly higher scores in auditory discrimination than the boys, but these failed to reach the .05 level of confidence. Correlations of intelligence and chronological age with auditory discrimination within each of the four student groups were not significant. When the total test sample of 120 students was considered, however, intelligence was found to be significantly correlated with auditory discrimination at the .01 level. In addition, the variable most highly correlated with auditory discrimination in the step-wise linear regression analysis was intelligence.

The computation of one and two way analyses of variance indicated that both reading achievement and socio-economic status were significantly related to auditory discrimination ability. There was no significant interaction effect between socio-economic status and reading achievement.

The Cosens Study

The major purpose of the second study was to determine the effect of training in auditory discrimination on both the reading achievement and the auditory discrimination of grade one subjects who scored low on the *Fast-Cosens Auditory Discrimination Test.* It also investigated the relative difficulty of discriminating various types of sounds for pupils in the test population.

The test population involved pupils from four grade one classrooms in two Edmonton Public Schools. A sample was selected on the basis of results obtained from the administration of the *Fast-Cosens Auditory Discrimination Test* to 117 students in these four classrooms during May. The 72 children below the 60th percentile on this test were given an individual audiometer test, and the 12 subjects who failed this test were eliminated from the study. The sixty children who passed the audiometer test were randomly assigned to the control and experimental groups.

The experimental study involved a pre-test—treatment—post-test comparison of subjects given training in auditory discrimination with subjects not given training. Pre-test and post-test scores were obtained for oral reading, silent reading, and auditory discrimination. The *Gray Oral Reading Tests,* Forms A and B, were used to test oral reading, and the *Lee-Clark Reading Test,* First Reader, Forms A and B, were used to test silent reading. Intellectual ability and mental age were measured by the *California Short-Form Test of Mental Maturity,* Level 1.

Treatment involved a four week training period from mid-May to mid-June during which the experimental group received word pair exercises and the control group listened to recorded stories. Lessons were presented at listening centers for approximately ten minutes each day.

The following reader characteristics were considered as possible bias variables in the study: auditory acuity, sex, intelligence, mental age, chronological age, and socio-economic status. Data were processed using t-tests and multiple linear regression models.

Performance on the Auditory-Discrimination Test

The *Fast-Cosens Auditory Discrimination Test* scores were analysed in several different ways to examine ability to discriminate specific types of sounds. The results of this analysis tended to provide statistical verification for many of the findings in the Fast study.

Performance on the 133 unlike word pairs indicated that some contrasts were definitely more difficult than others for grade one subjects in the total test population. Contrasts between stops and between nasals were significantly more difficult to discriminate than all others. Fricative-stop comparisons, third in difficulty, were significantly more difficult than glide-lateral comparisons and affricate-fricative comparisons. Contrasts between fricatives, affricate-fricative comparisons, and glide-lateral comparisons were all relatively easy.

When all sound contrasts were considered, subjects performed significantly better on voiceless than on voiced sounds at the .01 level of confidence. A comparison of pupil performance on voiced and voiceless sounds within sound contrasts, however, produced less definitive results. Subjects performed significantly better on voiceless than on voiced stops, and significantly better on voiceless than on voiced fricatives. Subjects performed slightly better on voiceless than on voiced affricate-fricative comparisons, and slightly better on voiceless than on voiced fricative-stop comparisons. These differences, however, were not significant.

A consideration of the position of sounds in words indicated that sounds in the final position of words were significantly more difficult than sounds in the initial or medial position. Sounds in the medial position were easiest to discriminate. Differences between mean scores for sounds in each position were significant at the .01 level of confidence.

A comparison of performance on like and unlike word pairs indicated that mean scores were significantly different. Hearing similarities of speech sounds in words was an easier discriminatory task than hearing differences for the subjects in this sample. The relative ease of hearing similarities as compared to differences is in accordance with the sequence of steps in perception outlined by Vernon (1952). The steps involved awareness, abstracting similarities for classification, perceiving differential, and identifcation. Perceiving differentia is a more advanced process than abstracting similarities and is dependent on both a pupil's awareness and his ability to abstract similarities. Hence,

hearing differences would probably be a more difficult perceptual task and would probably develop later than the ability to hear similarities.

The relationship between auditory discrimination and the possible bias variables of chronological age and sex was statistically assessed. Several studies have indicated that boys do not mature as quickly as girls in the auditory realm. The results of this study indicated that boys performed slightly better than girls on auditory discrimination. Differences were significant, however, only on like pairs. Subjects ranged in age from 76 to 91 months, with older subjects somewhat superior to younger subjects on auditory discrimination scores. However, most differences were not significant.

Effects of Treatments

Regression models were constructed to assess the effects and interactions of treatments and bias variables—I.Q., mental age, chronological age, sex, socio-economic status, and auditory acuity—on oral reading, silent reading, and auditory discrimination.

The effects and interactions of treatments and the bias variables on oral and silent reading were not found to be significant. Hence, taped training in auditory discrimination for four weeks did not bring significant improvement in oral or silent reading for the grade one subjects in this sample.

Although auditory training did not result in improved reading achievement, correlations suggest that there was a relationship between scores on the auditory discrimination and silent reading tests. The relationship between auditory discrimination and silent reading scores was significant at the .01 level of confidence ($t=.426$-$.457$). Factors which may have prevented the training program from having an effect on reading scores in this study were the length of the training program, the time of year involved, and the fact that auditory training was given as an isolated activity divorced from the reading program.

A consideration of total auditory discrimination scores indicated that the group which had received training in auditory discrimination was significantly superior to the control group when each bias variable was held constant. Hence, training in auditory discrimination appeared to result in improved ability to make auditory discriminations for all types of subjects in the experimental group.

When performance on particular types of items in the auditory discrimination test was considered, the results were much less definitive. The experimental group was superior to the control group on ability to discriminate stops and fricatives, but auditory training did not result in significantly improved scores on nasals, lateral-glide comparisons, affricate-fricative comparisons, and fricative-stop comparisons.

When items were considered in terms of voicing, the experimental

group performed slightly but not significantly better than the control group on both voiced and voiceless sounds. The effects of auditory training on ability to discriminate sounds in the initial, medial and final positions were most evident for sounds in the final position. The experimental group was significantly better than the control group on sounds in the final position, but auditory training did not result in significant improvement in the ability to discriminate sounds in the initial and medial positions.

Finally, a consideration of both like and unlike pairs revealed that auditory training resulted in significantly improved scores on like pairs but only slight improvement on unlike pairs. It would appear that the auditory training in this study improved ability to hear similarities in speech sounds of words more than the ability to hear differences in speech sounds.

Summary and Conclusions

The Fast study compared the auditory discrimination of selected speech sounds of first-grade students in low socio-economic areas with that of grade one students in other than low socio-economic areas. It also examined the relationship between auditory discrimination and reading achievement.

Analysis of the data utilizing one and two way analyses of variance revealed a significant relationship between auditory discrimination and reading achievement, and between auditory discrimination and socio-economic status at the .01 level of confidence. Analysis of the *Fast-Cosens Auditory Discrimination Test* revealed that the same pattern of difficulty was common to the students of both socio-economic groups, but the degree of difficulty experienced by the LSES group was consistently greater than that of the OSES group.

The Cosens study investigated the effect of taped training in auditory discrimination on grade one subjects. An analysis of pre- and post-test scores revealed that auditory training for pupils low in auditory discrimination resulted in significantly improved total auditory discrimination scores. Improvements were significant on stops and fricatives, on sounds in the final position, and on like word pairs. Auditory training did not result in significantly higher scores on oral or silent reading tests. Correlations between silent reading and auditory discrimination, however, were significant.

A number of conclusions concerning the discrimination of speech sounds can be drawn by combining the results of the Fast-Cosens studies. Nasals and stops were significantly more difficult than all other types of sound contrasts. Only 75 per cent of the OSES group and 58 per cent of the LSES group were able to discriminate nasals. Scores on stop-fricative comparisons, glide-lateral comparisons, and

affricate-fricative comparisons were significantly higher than on other types of sound contrasts. On glide-lateral comparisons, 86 per cent of the OSES group and 73 per cent of the LSES group answered items correctly.

Subjects performed significantly better on voiceless than on voiced sounds at the .01 level of confidence. Voiceless fricatives were the easiest and voiced fricatives were the most difficult items for both socio-economic groups.

Sounds in the final position of words were significantly more difficult than sounds in the initial or medial position. Sounds in the medial position were easiest to discriminate. Both socio-economic groups found that stops in the final position and affricate-fricative comparisons in the initial position were difficult items. In addition, the LSES group had extreme difficulty with nasals in the final position. The easiest sounds to discriminate were voiceless fricatives in the medial position.

Mean scores on like pairs were significantly higher than mean scores on unlike pairs.

Correlations of sex and chronological age with auditory discrimination were not significant on either study. The Fast study, however, found that IQ and auditory discrimination scores were significantly related.

Implications

The Cosens study clearly demonstrated that the ability to hear similarities and differences of speech sounds in words can be improved through instruction. Although maturation is probably an important factor, auditory training need not be delayed beyond the end of the grade one year. The fact that students from low socio-economic areas scored significantly lower on auditory discrimination than other students suggests that a well structured auditory discrimination program is particularly important for children in low socio-economic areas.

Special training in auditory discrimination near the close of the grade one year did not result in improved reading achievement. Since correlations between auditory discrimination and silent reading achievement were significant in both studies, however, it is probable that improvement in the ability to make auditory discriminations would result in increased silent reading scores at some point in a child's school career. Perhaps auditory discrimination training near the beginning of the grade one year as an integral part of the reading program would have a significant impact on reading achievement.

References

Blishen, B., *et al. Canadian society: sociological perspectives.* Toronto: The MacMillan Company of Canada, Ltd., 1961.

Bond, G. L. *The auditory and speech characteristics of poor readers.* New York: Teachers College, Columbia University, 1935.

Bruns, J. M. An experimental study of auditory discrimination ability of children with articulation defects. *Exceptional Children,* 1957, *23,* 264-265.

Chall, Jeanne, Roswell, Florence G., and Blumenthal, Susan H. Auditory blending ability: a factor in success in beginning reading. *Reading Teacher,* 1963, *17,* 113-118.

Christine, Dorothy, and Christine, C. The relationship of auditory discrimination to articulatory defects and reading retardation. *Elementary School Journal,* 1964, *65,* 97-100.

Clark, Ann D., and Richards, Charlotte J. Auditory discrimination among economically disadvantaged and non-disadvantaged pre-school children. *Exceptional Children,* 1966, *33,* 259-262.

Cosens, Grace V. An experimental study of the effect of training in auditory discrimination on reading achievement in grade one. Unpublished masters thesis, University of Alberta, 1968.

Deutsch, Cynthia P. Auditory discrimination and learning social factors. *Merrill-Palmer Quarterly of Behavior and Development,* 1964, *10,* 277-296.

Deutsch, M. The disadvantaged child and the learning process. In A. H. Passow (Ed.) *Education in Depressed Areas.* New York: Teacher's College, Columbia University, 1963.

Dykstra, R. Auditory discrimination abilities and beginning reading achievement. *Reading Research Quarterly,* 1966, *1* (3), 5-34.

Fast, Dolores J. The effect of socio-economic status on the development of auditory discrimination as it relates to reading achievement. Unpublished masters thesis, University of Alberta, 1968.

Gates, A. I. A correlational study of a battery of reading diagnostic tests. *Journal of Educational Research,* 1947, *40,* 436-447.

Gates, A. I. A further evaluation of reading readiness tests. *Elementary School Journal,* 1940, *40,* 577-591.

Gates, A. I., and Bond, G. L. Reading readiness: a study of factors determining success and failure in beginning reading. *Teachers College Record,* 1936, *37,* 679-685.

Guilford, J. P. *Psychometric methods.* Toronto: McGraw-Hill Book Company, Inc., 1954.

Harrington, Sister Mary James, and Durrell D. Mental maturity versus perception abilities in primary reading. *Journal of Educational Psychology,* 1955, *46,* 375-380.

Harris, A. J. Effective teaching of reading. New York: David McKay Co., Inc., 1962.

Liberman, A. M. Some results of research on speech perception. In S. Saporta (Ed.) *Psycholinguistics: a book of readings.* New York: Holt, Rinehart and Winston, 1966, 142-153.

Miller, G. A. *Language and communication.* Toronto: McGraw-Hill Book Company, Inc., 1951.

Miller, G. A., and Nicely, Patricia E. An analysis of perceptual confusions among some English consonants. In S. Saporta (Ed.) *Psycholinguistics: a book of readings.* New York: Holt, Rinehart and Winston, 1966, 153-175.

Monroe, Marion. *Children who cannot read.* Chicago: University of Chicago Press, 1932.

Mortenson, W. P. Differences in performance of beginning first-grade pupils on selected economic status and sex. *Dissertation Abstracts,* 1967, *28A,* 547-548.

Olmsted, D. L. A theory of the child's learning of phonology. *Language,* 1966, *42,* 531-535.

Reid, Ruth L. Auditory aspects of reading readiness. Unpublished masters thesis, University of Alberta, 1962.

Robinson, Helen M. *Why pupils fail in reading.* Chicago: University of Chicago Press, 1946.

Steinback, Sister Mary Nila. Foundations of a successful reading program. *Education,* 1953, *73,* 543-555.

Templin, Mildred C. *Certain language skills in children.* Minneapolis. The University of Minnesota Press, 1957.

Thompson, Bertha B. The relation of auditory discrimination and intelligence test scores to success in primary reading. Unpublished doctoral dissertation, Indiana University, 1961.

Thorndike, E. L., and Lorge, I. *The teacher's word book of 30,000 words* (3rd ed.) New York: Teachers College, Columbia University, 1959.

Wepman, J. M. Auditory discrimination, speech and reading. *Reading Teacher,* 1960, *13,* 325-378.

Wepman, J. M. The interrelationships of hearing, speech and reading. *Reading Teacher,* 1961, *14,* 245-247.

Wheeler, L. R., and Wheeler, Viola D. A study of the relationships of auditory discrimination to silent reading abilities. *Journal of Educational Research,* 1954, *48,* 103-113.

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Students' Attitudes to Teaching Methods[1]

College of Education students in the Cambridge Institute of Education area (England) were studied by the application of questionnaires at the beginning and end of their courses. Their attitudes to teaching methods (lecture, tutorial and seminar) were found to be very similar to all other groups of students investigated—highly unfavourable to the lecture method, strongly in favour of tutorial and seminar. These differences that appear between students are related to their political but not their religious views. There are also differences connected with their subject specialism and age. A student typology based on attitudes to teaching methods is found to stand up to analysis in a College of Education as well as a university setting.

In the course of studying the effect of Colleges of Education on student-teachers' attitudes to educational questions, the opportunity was taken to administer a questionnaire, assessing their attitudes to the lecture, tutorial, and seminar as teaching methods (McLeish, 1968). Every student completing the three-year course in the ten Colleges of the Cambridge Institute of Education (England) in the final term of 1968 was tested (N=1,238) using the questionnaire which is available elsewhere (McLeish, 1970). Only a handful of students refused cooperation—the sample is virtually complete. In addition, other data were available for each student, including the final examination result, main subject being studied, personality structure, social, political and educational attitudes, and other information. Comparable measures on other (control) groups were also collected: detailed inter-connections and comparisons are set out elsewhere (McLeish, 1970).

The teaching methods questionnaire consists of thirty statements—ten each about the lecture, tutorial, and seminar grouped in three sec-

[1] My grateful thanks are due to Margaret Knight of Cambridge University (New Hall), who assisted me in collecting the data and analyzing it in a preliminary way; to Dan Precht of the Division of Educational Research, U of A, who wrote a number of the programs used and gave advice at various stages on the computer analyses; to Kailash Agrawol my research assistant at Edmonton who helped prepare the material for the computer, and to The University of Alberta at Edmonton for a small research grant which enabled cards to be cut for the computer analysis. Grateful thanks are due to the Alberta Human Resources Research Council for a grant in aid of this research.

tions. Half are favourable to the given method, half are unfavourable. The attempt was made through preliminary studies to ensure an equality of emphasis and balance between the three sections. The respondent is invited to say whether he (she) strongly agrees, agrees, disagrees, or strongly disagrees with each statement. The scoring scheme is as follows: three points are awarded for strong agreement with a favourable statement, two for agreement, one for disagreement, and zero for strong disagreement. The scheme is reversed in scoring unfavourable statements. Section subtotals provide three scores which give the student's attitude to each of the methods. It will be clear that a score of 30 points indicates the most favourable attitude to a specific method; a score of 15 represents an attitude of neutrality or indifference; a score of zero signifies the most unfavourable attitude possible on these three scales.

Earlier studies (McLeish, 1968) have shown that older students, that is, experienced teachers on courses, strongly disfavour the lecture in comparison with the seminar and tutorial methods—the more intelligent and academic students more so than others. The present group does not differ from these other students (*and* lecturers) in this respect. As a group, they dislike the lecture system and favour more participatory methods of teaching.

Factor analysis and analysis of variance were used to discover interrelationships between questionnaire items and between the various qualities of students and their scores on the questionnaire. In reporting these analyses, figures will be quoted only where the relationships have been shown to be significant.

Analysis of Variance: Individual Differences

The differences between men (N=84) and women (N=1,154) are not significant with respect to their attitudes to the lecture, seminar, or tutorial. However, the differences which are associated with declared allegiance to the major political parties are significant in two cases—at an extremely high level in the case of the lecture, less so in the case of the seminar, and not at all in the case of the tutorial (see Table 1).

It will be observed that the greatest difference is between the Conservatives who are (relatively speaking) favourable to the lecture, and the Labour supporters who favour the seminar method. Liberals and non-political students adopt an intermediate position. In comparing religious differences only the lecture is found to discriminate. The basic division is between the group who declare they have *no* religious affiliation (atheists and agnostics, presumably) and the rest, especially the Church of England and Roman Catholic students (see Table 2).

The double classification—politics by religion—reveals that the religious differences are, in fact, a statistical artifact (Table 3). In no case

TABLE 1

STUDENTS' ATTITUDES: POLITICAL DIFFERENCES

			Average Scores		
	Group	N	Lecture	Tutorial	Seminar
1.	Conservatives	499	13.728	20.070	20.233
2.	Liberals	161	12.795	20.155	20.453
3.	Labour	194	12.330	20.227	21.031
4.	Non-political	384	12.781	19.729	20.195
	Total	1,238	13.094	20.000	20.375
	Significance level		p = .00003	n.s.	p = .037

TABLE 2

STUDENTS' ATTITUDES: RELIGIOUS DIFFERENCES

			Average Scores		
	Group	N	Lecture	Tutorial	Seminar
1.	Roman Catholics	33	13.333	20.182	20.212
2.	Church of England	650	13.405	19.972	20.422
3.	Non-conformists	223	13.054	20.202	19.955
4.	No religion	332	12.488	19.901	20.581
	Total	1,238	13.094	20.000	20.375
	Significance level		p = .0037	n.s.	n.s.

are the religious differences significant, once the political effect has been removed. The cause of the apparent religious differences is that the sample is heavily weighted with Church of England students (N=650;

TABLE 3

STUDENTS' ATTITUDES: CROSS-CLASSIFICATION- POLITICS X RELIGION

	1. Roman Catholic	2. Church of England	3. Non-Conformists	4. No Religion
Average Score for Lecture				
1. Conservatives	13.72	13.73	13.93	13.25
2. Liberals	16.00	13.48	12.38	12.62
3. Labour	13.00	12.12	12.85	12.31
4. Non-political	12.38	13.35	12.62	12.31
Average Score for Tutorial				
1. Conservatives	20.17	20.12	20.05	20.12
2. Liberals	26.00	20.00	20.56	20.56
3. Labour	19.50	20.53	20.55	20.03
4. Non-political	20.00	19.42	20.02	19.61
Average Score for Seminar				
1. Conservatives	19.61	20.32	19.57	20.74
2. Liberals	22.00	20.30	20.26	21.02
3. Labour	20.83	21.27	20.42	21.02
4. Non-political	20.87	20.31	19.99	20.19

Significance Levels

Lecture Scores:	Political differences	p = .001
	Religious differences	p = .176
	Interaction P x R	p = .624
Tutorial Scores:	Political differences	p = .031
	Religious differences	p = .798
	Interaction P x R	p = .625
Seminar Scores:	Political differences	p = .063
	Religious differences	p = .229
	Interaction	p = .891

about 50 percent of the sample) the great bulk of whom are Conservatives, N=341. Similarly, the disproportionate number of Labour supporters (N=194) who are also atheists and agnostics (N=87; 45 percent of the group) is another influence working in the same direction to confound the religious comparisons.

The age of the student has also a bearing on his or her attitude to teaching methods. Older students are progressively *more favourable* to the lecture, in fact, this is the most significant trend established in the data (p=.00003) (Table 4). They are also, as a group more favourable to the tutorial method. This particular relationship appears to be non-linear: very young students favour the tutorial, there is an apparent decline in favourableness between 21 and 30, followed by a sharp increase in students over 30 years of age. The trend towards disfavouring the seminar is not significant.

TABLE 4

STUDENTS' ATTITUDES: AGE DIFFERENCES

		Average Scores		
Group	N	Lecture	Tutorial	Seminar
1. Under 21 yrs.	1,059	12.885	19.972	20.484
2. 21-24 yrs.	45	13.178	19.467	19.533
3. 25-30 yrs.	24	13.708	19.375	19.917
4. 31-40 yrs.	72	14.549	20.831	19.944
5. Over 40 yrs.	38	15.447	20.316	19.711
Total	1,238	13.094	20.000	20.383
Significance level		p = .00003	p = .011	n.s.

The students were then classified according to their choice of main subject into 14 groups. The "main subject" is chosen by the student as a means of "personal development" and is supposed to be unconnected with the vocational training side. In the case of each teaching method the differences were found to be highly significant. Subsequently, these subject areas were reclassified on the basis of two principles (a) that the main subjects actually do belong together in a meaningful classifi-

cation, and (b) that the averages were found to be virtually the same, before merging, in the first analysis. Re-analysis of scores classified in terms of the newly classified main subjects confirms that attitudes to teaching methods depend on the nature of the subject being taught (Table 5).

TABLE 5

STUDENTS' ATTITUDES: MAIN SUBJECT DIFFERENCES

Group	N	Average Scores		
		Lecture	Tutorial	Seminar
1. Humanities	444	12.55	20.59	20.97
2. Science	214	13.49	19.90	20.23
3. Mathematics	61	14.08	19.56	19.52
4. Art & Craft	296	13.71	19.79	20.03
5. Music	70	13.29	20.24	20.11
6. Physical Education	27	11.96	19.07	20.48
7. Sociology or Education	32	12.31	19.34	20.88
8. Home Economics	54	12.18	17.93	19.39
9. Specialist Needlework	11	13.63	20.18	18.63
10. Miscellaneous (Failures)	29	13.09	19.99	20.38
Total	1,238	13.09	20.00	20.38
Significance Level		p = .0001	p = .00003	p = .0007

The major differences worthy of comment are the relatively high regard mathematics students have for the lecture and their lack of enthusiasm for the tutorial and seminar. This is also a feature of the responses of students in arts and crafts. The other difference worthy of comment is the lack of enthusiasm for *any* of the three methods shown by students of the more "practical", or professionally-oriented, main subjects—home economics, physical education, sociology and education. Those students (N=29) who could not be classified in terms of main subjects, since they were omitted from the pass lists, are distinguished only by being so average in their attitudes.

The examination results of each student were coded to distinguish between a pass, credit or distinction. Results were available for the

final examinations in practical teaching, two education papers, the main and advanced main subject (if taken). The coded scores were also added to yield a consolidated examination mark—this can be regarded as an estimate of all-round academic ability. Students who failed did not appear at all on the lists and had to be given a score of zero in all of these cases. The different levels of ability revealed by these procedures were found, in *all* the examination results, to have no relation to students' attitudes to the lecture method. The significant differences consisted of attitude to the tutorial (theory of education, main subject, and consolidated examination mark) and to the seminar (theory of education). The tendency was for the more able students to favour the seminar and tutorial to a greater degree than the weaker or less able. Although statistically significant, the differences, except in the case of the consolidated examination mark, are fairly small (Table 6).

TABLE 6

STUDENTS' ATTITUDES: ACADEMIC ABILITY DIFFERENCES

Consolidated Mark			Main Subject			Theory of Education			
Scores	N	Tutorial	Scores	N	Tutorial	Scores	N	Tutorial	Seminar
0	29	19.99	0	29	19.99	0	29	19.99	20.380
1	3	17.333	1	657	19.702	1	982	19.702	20.280
2	305	19.636	2	394	20.421	2	183	20.421	20.536
3	116	19.810	3	158	20.285	3	44	20.285	22.068
4	308	19.952							
5	203	19.966							
6	152	20.605							
7	71	20.423							
8	28	20.831							
9	15	21.333							
10	8	19.500							
Total	1,238	20.000	Total	1,238	20.000	Total	1,238	20.000	20.381
Significance Level		p = .043			p = .001			p = .0002	p = .004

This may be due to the crudeness of the criterion used to discriminate between the different levels of academic ability.

Lastly, a *detailed* breakdown of students in terms of their declaration of religious affiliation was made. The "non-conformist" category was

expanded, yielding nine more distinct religious groups. The numbers of cases in certain sects were very small. In terms of this breakdown, differences in attitude towards the lecture, tutorial and seminar were not significant. However certain consistent trends appeared from which it was concluded that the seven Jews in the sample were most favourable to all three methods, whereas the single Muslim and the Buddhist consistently least favourable.

Factor Analysis

The thirty items of the questionnaire were intercorrelated for the total sample of 1,931 respondents (this includes groups of experienced teachers in addition to the college population). Seven factors were extracted which account for just over 50 percent of the test variance. The factors were routinely subjected to various rotations—Equimax, Varimax, Quartimax. But the effect of these rotations was simply to obscure the meaning of the analysis. The seven orthogonal factors readily lend themselves to interpretation, the patterns of positive and negative signs accurately reflecting the basic structure of the questionnaire.

The first factor is a general factor (only one question has a small negative loading). This factor accounts for just under 10 percent of the total variance. Clearly it is a dimension which reflects the students' general attitude to the three teaching methods as being generally acceptable or generally unacceptable. In other words, the factor analysis yields a classification of students previously recognized in a student typology derived from a comparison of attitudes to these three methods in a University population (McLeish, 1968). The first factor refers to the "enthusiast-rebel" dichotomy. In the university population, 21 percent of the students were polarised along this dimension, in contrast to 10 percent of the total variance in this sample.

The second factor, with which just over one-sixth of the variance is associated, contrasts all the lecture statements with those which refer to the tutorial and seminar. This indicates a second bipolarity previously recognized, and referred to the "oracular-participatory" dichotomy of attitudes in the student body. In the previous investigation, (McLeish, 1968) 38 percent of the university population split equally into these contrasting types, one strongly favouring the lecture method and rejecting the seminar and tutorial ("oracular"), the other the reverse ("participatory").

The third factor, in an exactly similar way, contrasts the tutorial with the lecture and seminar. This factor is associated with about seven percent of the total variance. It can be identified in terms of the student typology insofar as it discriminates between a "group-oriented" method (lecture and seminar) in contrast to an "individually-oriented" method

of instruction (tutorial). In the university population 16 percent of the students split equally along this dimension.

The fourth factor, which removes another four percent of the total variance, completes the student typology in that it contraposes statements favourable both to teaching methods as such and to the tutor-lecturer, against those which are unfavourable to the student (who is regarded as the source of the breakdown in the teaching-learning situation). The positive and negative signs can, of course, be reversed as the attitude represented is a bipolar one. The typology referred to previously (McLeish, 1968), classified the attitude and the student types involved as "tutor-centred" versus "student-centred". Twenty percent of the university population fell into one or other category.

The remaining three factors, which take out a total of 13 percent of the total test variance, are of little psychological interest. They are related to the technical and semantic aspects of the questionnaire. For instance, the fifth factor distinguishes between questionnaire statements worded in a positive, favourable sense and those with negative feeling tone. The sixth and seventh factors are concerned with the nature of the arguments used. The sixth factor relates to the question whether these criticisms of the particular method are based on educational or some other utilitarian principle. The seventh is concerned with whether the criticism is of individual teachers, who are ineffective practitioners of the particular method, or whether it is the method as such which is unbearable. As with all the other factors, both poles of the favourable-unfavourable dimension are sampled in the pool of student opinion.

References

McLeish, J. Lecture, tutorial, seminar: The student's view. *Education for Teaching*, 1968, 76, 102-114.

McLeish, J. *The lecture method.* Monographs on Teaching Method No. 1. Cambridge Institute of Education, 1968.

McLeish, J. *Students' attitudes and college environments.* 1970 (in press).

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Academic Performance of Students and the Cultural Orientation of their Parents

Students of Ukrainian descent in Northeastern Alberta (N=587) were divided into four groups according to the cultural orientation of the parents: bicultural, English, Ukrainian, and apathetic. The groups were compared as to their performance on the grade nine Alberta Examinations, on a standardized reading test (STEP) and on School and College Ability Tests (SCAT). Academic performance was expected to be higher or similar to the provincial average among students of the bicultural and English oriented parents because school work of these students was likely to be similar to the culture at home, and hence, reinforced. No significant differences were found. Thus, school performance was not associated with differences between the cultural orientations of the home and of the school.

At present there is considerable psychological and educational interest on the impact of cultural differences and their bearing on school progress and intellectual development of children. In a number of studies, cultural and social factors have been associated with success or failure in school (Gardner and Lambert, 1959; Conn, 1964). In fact, teachers in Northeastern Alberta have expressed the view to the investigators that students from English oriented homes have an advantage in school.

Consequently, the study reported here was undertaken to examine the academic performance of students of Ukrainian descent whose parents differed in their orientation to the English-Canadian and Ukrainian cultures. It was assumed that students whose parents have a definite interest in the English-Canadian culture have an educational advantage in that they receive additional reinforcement for their school

learnings at home. They might be expected to perform academically at a higher level than would the students whose parents have only a moderate or slight interest in the English culture. The indicators of performance were the provincial grade nine examination results, the Sequential Test of Educational Progress (STEP) reading test, and the School and College Ability Test (SCAT) tests.

Method

The grade 10 and 11 students (N=587) of Ukrainian descent in three counties of Northeastern Alberta, where the population is about 70 percent of Ukrainian origin, were asked to report the interest that their parents had in the English-Canadian and Ukrainian cultures on the 73-item Acculturation Survey (Saruk, pp. 68-77). In the questionnaire the two semantic differential scales consist of 23 bipolar dimensions. On the basis of the responses to the items on the Survey it was possible to distinguish the four orientations in terms of the following social-psychological reactions:

1. Interest in Ukrainian culture.
2. Facility in both languages, English and Ukrainian, by the students and their parents.
3. Parents' education.
4. Ukrainian and English association membership.
5. Self-concept.
6. Religion and customs.

In terms of changes in direction of acculturation or social consciousness the following two items were used as the criteria for evaluating the responses to all the items on the Survey:

1. My parents' interest in English culture is: very definite .....; definite ..... ; moderate .....; moderately weak .....; slight .....; not at all ..... .

2. My parents' interest in the Ukrainian culture is: very definite .....; definite.....; moderate.....; moderately weak.....; slight .....; not at all..... .

A distribution of parents in terms of cultural orientation which is based on the responses to these items is presented in Table 1. It can be noticed that the parents of 86 students were classed as holding a bicultural orientation; 55 an English-Canadian orientation; 265 a Ukrainian orientation; and 181 an indifferent or apathetic orientation. The four orientations were supported by the analysis of semantic differential ratings of these students' impressions of the English-Canadian and Ukrainian in terms of character and personality, such as, prejudiced, honest, popular, ambitious, etc. To verify further the categorization of parents based on students' statement and the characteristics of their cultural inclinations, the distribution of responses in the Acculturation

Survey were tabulated in percentages. Thirty items of the Survey were significant beyond the .05 level. For this analysis equal samples of 55 were selected by means of a Table of Random Numbers for each of the bicultural, English-oriented, Ukrainian-oriented, and apathetic groups. Furthermore, each student's statement of the cultural orientation of his parents was checked by the school principals who were well acquainted with the home backgrounds of their students; no discrepancies were found.

TABLE 1

DISTRIBUTION OF PARENTS BY INTEREST IN ENGLISH AND UKRAINIAN CULTURES AS REPORTED BY STUDENTS OF UKRAINIAN ORIGIN

Interest in the Ukrainian Culture	Interest in the English Culture: 1.Very Definite	2. Definite	3. Moderate	4.Moderately Weak	5. Slight	6.Not At All	Total
	Bicultural Orientation			Ukrainian Orientation			
1.Very Definite	8	20	68	5	9	2	112
2.Definite	6	52	150	19	12	0	239
	English Orientation			Apathetic Orientation			
3.Moderate	10	35	142	13	5	0	205
4.Moderately Weak	2	5	11	4	0	0	22
5.Slight	1	2	3	0	2	0	8
6.Not At All	0	0	0	0	0	1	1
Total	27	114	374	41	28	3	587

Analysis and Results

The grade nine examination results for each subject and the STEP and SCAT tests were subjected to one-way analysis of variance and to a discriminant function analysis to determine whether there were differences in the academic achievement of students from homes with the four different orientations.

The mean stanines for the total group of students on grade nine subject examinations were slightly higher than the scaled provincial average of 5.00 (Alberta, 1963). The difference was significant at the .01 level. The stanine means for SCAT quantitative were higher than

TABLE 2

MEANS AND STANDARD DEVIATIONS ON GRADE IX PROVINCIAL EXAMINATIONS OF STUDENTS GROUPED ACCORDING TO THE CULTURAL ORIENTATION OF THEIR PARENTS

	Subgroups								Whole Group	
	Bicultural		English Oriented		Ukrainian Oriented		Apathetic			
Unstandarized Tests:	Means	S.D.	Means	S.D.	Means	S.D.	Means	S.D.	Means	S.D.
Literature	5.14	1.61	5.06	1.48	4.99	1.87	5.04	1.67	5.03	1.73
Language	5.37	1.57	4.93	1.63	5.39	1.70	5.39	1.70	5.34	1.67
Social Studies	5.27	1.69	5.16	1.64	5.20	1.71	5.21	1.77	5.21	1.73
Mathematics	5.41	1.91	5.35	1.61	5.52	1.68	5.67	1.71	5.53	1.72
Science	5.29	1.85	5.51	1.28	5.42	1.67	5.63	1.75	5.47	1.70
Standardized Tests:										
STEP Reading	4.47	1.77	4.42	1.70	4.40	1.87	4.44	1.69	4.43	1.79
SCAT Verbal	4.34	1.76	4.22	1.50	4.11	1.75	4.30	1.77	4.21	1.75
SCAT Quantitative	5.28	1.75	5.11	1.59	5.34	1.76	5.46	1.89	5.34	1.79
N =	86		55		265		181		587	

the provincial averages ($p < .01$). The stanine means for the STEP reading tests were slightly but not significantly higher than the means for the SCAT verbal test. Nevertheless, for these two tests, the stanine means were lower than the scaled provincial average of 5.00 at the .01 level. The mean scores obtained by the students from each of the four orientation groups (Table 2) were not significantly different.

The number of students (N=587) selected for this study was a small fraction of the total number of 26,000 students who wrote the provincial grade nine tests. Thus, the performance of the group studied, though part of the provincial group, likely had negligible effect on the performance mean of the Alberta group.

TABLE 3

DISCRIMINANT FUNCTION ANALYSIS OF THE DATA

PRESENTED IN TABLE 2

	Normalized Vectors		
	I	II	III
Unstandardized Tests:			
Literature	-0.365	-0.218	0.011
Language	0.793	0.099	0.049
Social Studies	-0.068	-0.611	-0.107
Mathematics	0.184	0.080	0.143
Science	-0.378	0.738	-0.292
Standardized Tests:			
STEP Reading	0.004	-0.066	-0.460
SCAT Verbal	-0.188	0.101	0.815
SCAT Quantitative	0.148	-0.061	0.071
Latent Roots	λ_1 = 0.019	λ_2= 0.014	λ_3= 0.006
Percent of Trace	49.3	36.3	14.3
	χ^2 10.887	8.063	3.175
	df 10	8.0	6.0
	p NS	NS	NS

The stanine means for the five grade nine subjects, for the STEP reading test, and for the verbal and quantitative sub-tests of the SCAT of students from the four orientation groups were subjected to an analysis of variance. None of the F ratios obtained was significant at the .05 level of confidence. Also, students from bicultural, English-Canadian oriented, Ukrainian oriented, and apathetic homes were not discriminable by means of a discriminant function analysis (Table 3).

The four groups of students of Ukrainian descent, whose parents differ in cultural orientation, did not differ from each other on the grade nine provincial examinations, the STEP reading test, and the SCAT tests. Therefore, within the framework and limitations of this study no statistically significant difference was found in the academic performance of students of Ukrainian origin whose parents differ in cultural orientation.

Discussion

Although no difference among the groups were found in this study, differences may exist, however, in some types of learning activities such as comprehension, association, making inferences, and drawing conclusions.

The absence of difference in academic performance among the four groups may have the following implications.

1. Cultural diversity may not be as much of a handicap in school progress as was expected.

2. Bilingualism may not be associated in a detrimental way with the education of children.

3. Cultural similarity of the home to the school may not be favourably related to school progress.

For the total group of students the stanine means in literature, language, social studies, mathematics, and science examinations, and the SCAT quantitative, were slightly higher than the provincial averages and this difference was statistically significant. The stanine means of the STEP reading test and the SCAT verbal were lower than the provincial average. These differences were also statistically significant at the .05 level.

Lower stanine means in the STEP reading test and in the SCAT verbal sub-test may have been associated with the nature of the items on these tests. The items may have been more suitable for students whose parents have a different cultural orientation from those in this study.

Often, educators and others are of the opinion that students from English-Canadian oriented homes have an advantage in school. In this

study this view is not supported. Therefore, this investigation has significance in the field of education for groups who differ from the majority culture and where opinions frequently advanced about the education of minorities, often without basis in fact, have much influence.

References

Alberta, Department of Education, Special Services Branch. *Alberta Testing and Research Bulletin.* Edmonton: Queen's Printer, 1962.

Conn, G. M. Vocabulary of bilinguals. Unpublished M.Ed. thesis, The University of Alberta, 1964.

Coplen, S. E., and Ruble, R. A. A study of culturally imposed factors on school achievement in metropolitan area. *Journal of Educational Research,* 1964, *58,* 16-21.

Demos, C. D. Attitudes of student ethnic groups on issues related to education. *California Journal of Educational Research,* 1960, *11,* 204-206 plus.

Lambert, W. E., Gardner, R. C., Alton, R., and Tunstall, K. *A Study of the Roles of Attitudes and Motivations in Second-Language Learning.* Montreal: McGill University, 1960.

Saruk, A. Academic performance of students of Ukrainian descent and the cultural orientation of their parents. Unpublished M.Ed. thesis, The University of Alberta, 1966.

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BOOK REVIEWS

EDUCATIONAL RESEARCH BY PRACTITIONERS

By William C. Budd and Sam P. Kelly. New York: Harper & Row, 1970. 148 pp.

A number of years ago a thrust towards action research appeared on the Canadian scene. Various provincial teacher organizations and their national federation were engaged in workshops and seminars designed to introduce teachers to action research concepts. In several cases, monographs and other printed instructional materials were prepared (e.g. E. J. Ingram and F. Robinson's 1963 ATA Monograph No. 5—"A Teacher's Guide to Classroom Research"). Whether or not the approach was widely accepted by Canadian practitioners has never been adequately determined. Moreover, the utility of devoting any great amount of effort towards implementing action research by classroom teachers is open to serious questioning. While one can agree with the notion that teachers should be careful observers of what goes on in their classrooms, the methodologies of action research may be nothing more than an imitation of the real thing. In fact, while teacher organizations have continued to emphasize research activity as part of the legitimate concern of the professional, the major research and development thrusts and programs for training researchers have appeared not in teacher organizations but in other agencies.

However, in spite of the fact that the action research movement may not have had any significant effects, some people continue to work in this area. The book under review here is indicative of one such continuing effort. The authors have been involved in an introductory graduate course leading to an M.Ed degree. The book itself consists of some twenty-seven descriptions of research projects carried on by practitioners with no strong bases for generalization or theory building. In each case, some critical commentary is provided about the design and evaluation of the study. At various places in the book, some basic statistical concepts are introduced; e.g. on page 13, chi-square is described; "null hypothesis" is identified on page 16; "correlation" and "significance" are defined on pages 16 and 17, etc.

Two or three points should be made about this book. First, the critical comments on each of the studies are, in themselves, reasonable and generally acceptable. However, if practitioners are to become critical users of research they may not necessarily gain very much from reading these critiques.

It does not seem reasonable to assume that watching a critic in action does much for one's own critical faculties. Where rather important questions about research design and statistical techniques are concerned, this inductive mode of instruction may have only limited value.

Secondly, the approach which predominates in the studies and the critical comments is too much in tune with classic experimental (In most of the cases described, "pseudo-experimental" is possibly the most accurate term one can use.) research designs. Inferential statistics are used with great abandon in cases where an "eye-ball" inspection of frequency tables would probably suffice. In general terms, if data collection by practitioners is to serve a useful purpose, one can argue that it could best be conceived of as part of an information for decision-making model rather than in the classic models of educational research. The current literature on evaluation would probably provide many more useful leads for practitioners and professional development workers.

As a final comment, one should stress the potential usefulness of action research as part of the strategies used by change agents. In Everett Rogers' analysis of the process of adoption of innovations, mention is made of "trial" and "evaluation" phases. If practitioners could be persuaded to field test innovations in a way which used some of the techniques of action research, some impact on adoption rates would probably occur. Budd and Kelly fail to mention this application of action research; this failure, coupled with their emphasis on classic experimental modes of thought, tends to detract from what could have been a useful book.

Finally, as an indication of what an introductory graduate course in research might look like, this book gives little cause for optimism about the state of development of research competencies, at least as they are viewed by these particular authors.

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ORGANIZATIONAL TRAINING FOR A SCHOOL FACULTY

By Richard A. Schmuck and Philip J. Runkel. Eugene: Center for the Advanced Study of Educational Administration, University of Oregon, 1970.

Critics of public education are often quick to point out the inadequacies and inferior nature of school resources but they underrate or ignore completely the *process* of using resources. Schmuck and Runkel believe a major effort must be directed toward the manner in which school resources are utilized: "The quality of a resource is important. However, more attention should be placed on improving group processes in schools than they now receive; for it is the interaction of students, teachers, and curriculum materials in all their various interrelationships that determines the efficient use of the school's resources."

Attention to the process of resource utilization in the school plant can result in innovations which do not require the existing organizational structure to undergo appreciable alterations.

A major school social system resource lies in the task-oriented subgroups which exist for the purposes of problem-solving, planning, and decision-making. Schmuck and Runkel attempted to improve the functioning of these sub-groups within a single school by involving its staff in group process training workshops utilizing the laboratory method.

Training began with the faculty of Highland Park Junior High School in Beaverton, Oregon, in August of 1967. The initial six-day workshop was comprised of group exercises designed to build increased openness and ease of interpersonal communication among the faculty. This was followed by a problem-solving sequence structured in such a manner as to allow the participants to progress from the identification of problem areas within their organization through to the development of a strategy which would remove or alleviate each difficulty.

Two one and one-half day workshops were held with the staff during December and February of the school year. These workshops provided an opportunity for the participants to evaluate their progress and to continue to develop new approaches to improving their working relationships and problem-solving capabilities.

As a result of their training interventions, Schmuck and Runkel were able to increase staff participation and cooperation, increase the sharing of teaching resources, improve the clarity of roles within the school's organization, improve the productivity of faculty meetings, and reduce the overload carried by some staff members. The turnover of staff at the end of the school year was considerably below the rates common to other district junior high schools. Most important, however, the authors feel they were successful in establishing a climate of innovation and in increasing the effectiveness of the collaborating sub-groups operating within the existing organizational structure of Highland Park School.

Individuals not familiar with the use of the laboratory method as a vehicle for accomplishing organizational change will find this research

monograph a valuable introduction to the field; of particular interest are the extensive descriptions of the training exercises and the rationale for their use. Those who are familiar with developments in this field will appreciate the detailed criticisms the authors provide of their endeavors at Highland Park School and no doubt will find the comments on laboratory design enlightening. Individuals interested in assessing the effectiveness of laboratory training designs in educational settings will find the extensive discussion of research results and the large number of appendices containing elaborative material and research instruments, to be of considerable value.

This monograph would be of value to anyone who has the responsibility or interest in helping to make human organizations more effective. Educators in the field planning to organize inservice training programs or staff development activities would obviously find this work useful. The Highland Park training model might also be of interest to educators in teacher training institutions. Ideally, young university graduates would be sent to their first teaching jobs with well-developed skills in the areas of interpersonal communication and group problem solving procedures.

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